ELECTRICAL WEST
AUGUST 1961
A McGRAW-HILL PUBLICATION

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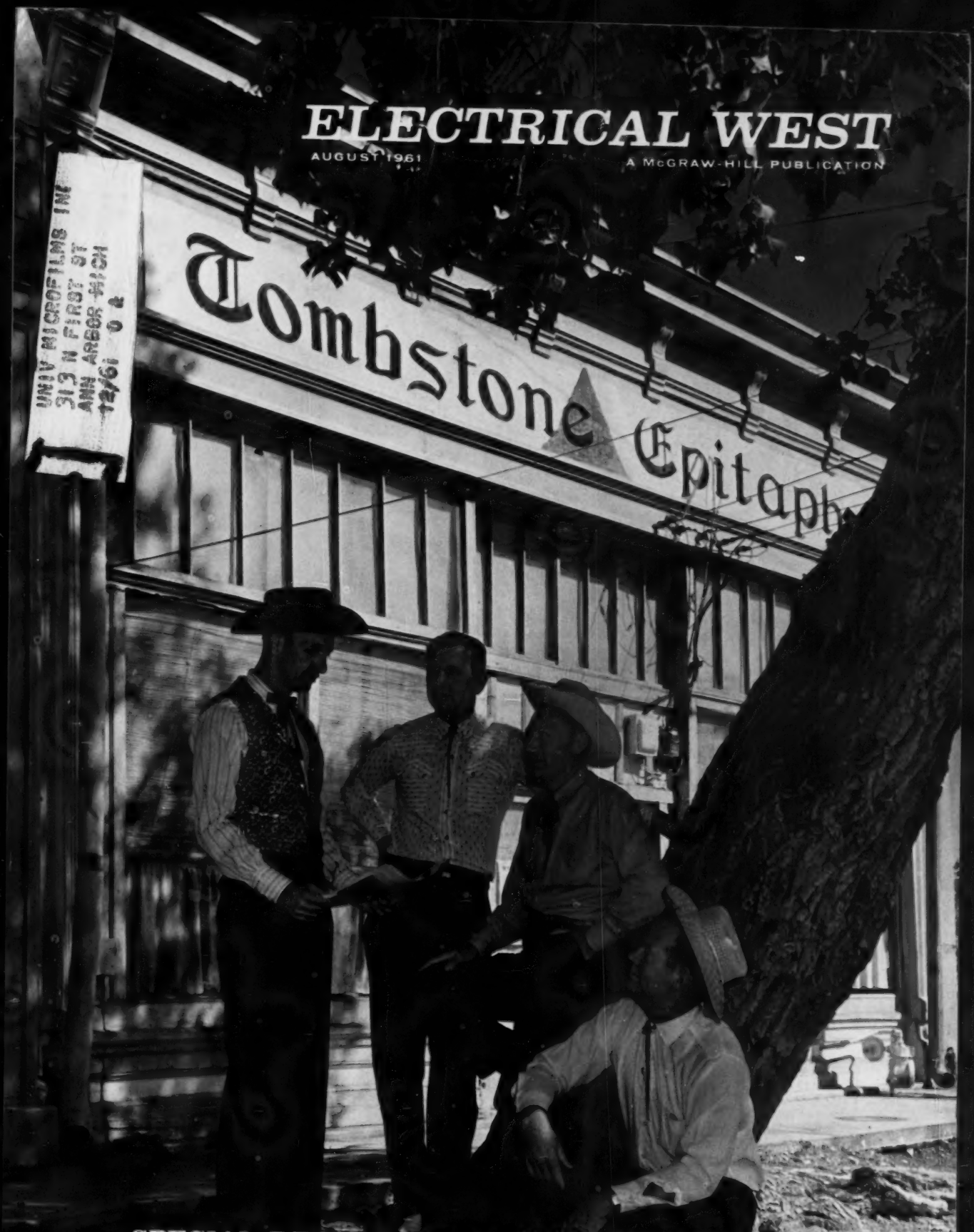
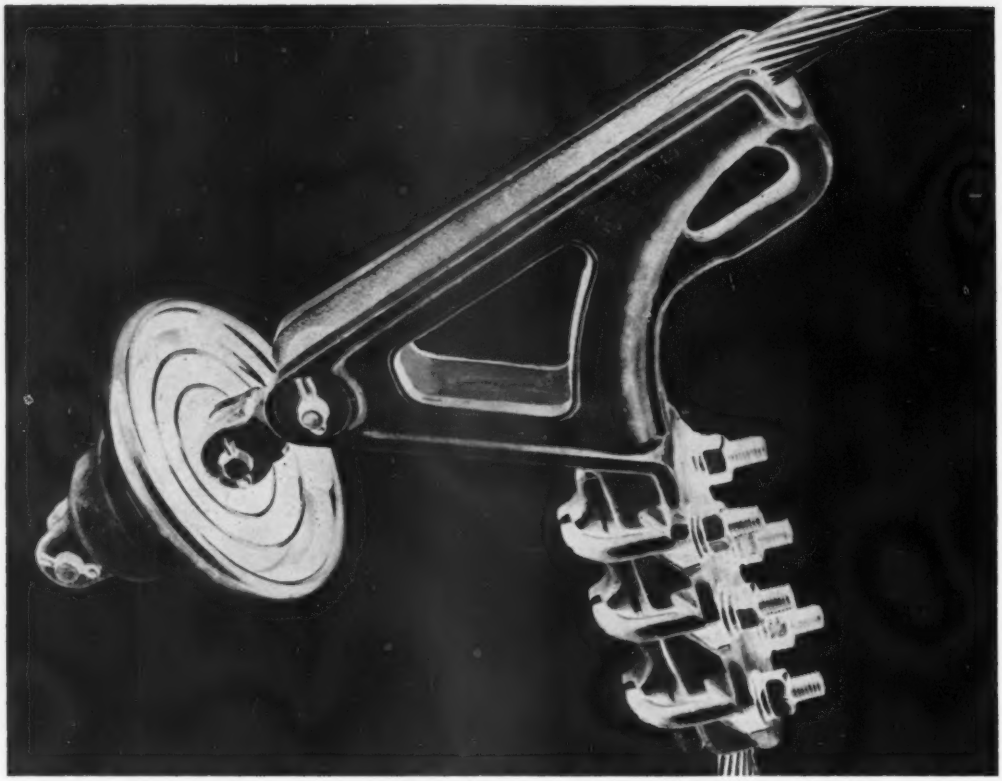


SPECIAL REPORT: Arizona Public Service Company

APS creates the growth climate

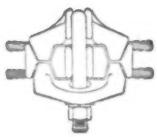


WHAT'S IN A BETHEA CABLE FITTING?

Millions of Bethea Clamps have been supplied to electric utilities in this country and abroad. All are designed, tested, produced and guaranteed to meet the most rigid industry requirements.

For example, Bethea dead end clamps offer unusual effectiveness and economy — for every application. From two U-bolt standard styles with superior holding power, to multi U-bolt "specials" for greased core conductors, all have been designed for easy installation and hot workability. Materials are 356-T6 aluminum alloy body and keeper, high strength steel hardware and stainless steel cotter pins.

A clamp for every general and special application — write for catalog and test data.



QUALITY CABLE FITTINGS AND CONNECTORS

Bethea
COMPANY, INC.

P. O. BOX 1407 — BIRMINGHAM, ALABAMA

FOR IMMEDIATE SERVICE CALL

MAYDWELL & HARTZELL, INC.
Representative nearest you:

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San Diego 20, Calif. — JUniper 2-6749

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San Francisco 7, Calif. — VA 6-6900

203 Genessee
Medford, Oregon — SPring 2-9195

2318 N. W. Vaughn St.
Portland 10, Oregon — CApital 8-4173

1214 Poplar Place—South
Seattle 44, Washington — EAst 3-1270

121 S. Monroe St.
Spokane 8, Wash. — MAdison 4-3285

WAKE UP AND LIVE

While casting about for a way to summarize the factors affecting the nation's economic life, discussed in the first seven articles of this series, a letter arrived from Montana Power Co.'s R. A. Neill, telling about the interesting and unique way of presenting economic information to the public devised by his company. It was the answer to an editor's dilemma.

Since the first of the year, Montana Power has been running editorial-style cartoon advertisements in 58 weekly and daily newspapers throughout its service area. The concept is based on readership surveys, which reveal that cartoons attract far more readers than the average ad.

Montana Power, through its agency, Harris & Love Inc. of Salt Lake City, Utah, commissioned the Pulitzer prize winning editorial cartoonist, Reg Manning of Scottsdale, Ariz., to do a cartoon series on our economic system, three of which are shown herewith. Cartoon subjects are chosen with four main objectives in mind. (1) A comparison of our free enterprise system with other forms of government. (2) An explanation of business terms and the benefits of the free enterprise system. (3) The dangers of large government and government encroachment upon business. And (4) The promulgation of the idea that what benefits or hurts business benefits or hurts the employee, the customer and the community.

Cartoons are designed to tie in with holidays, such as Lincoln's Birthday, Washington's Birthday, Mother's Day, Fourth of July, etc., to keep them timely. Size of the cartoons is three column by 6¾ in. Large blow-ups of the ads, 22 x 28 in., are printed on cardboard easels and displayed in the Montana Power offices and collection stations throughout its area. Many schools have requested the posters after they have served their purpose for public display.

Oh Say, Can You See - ?
By Reg Manning
A "LIBERAL" TRANSLATION — (HOW TO UNDERSTAND THE LANGUAGE OF A "WELFARE ECONOMY")
WHEN YOU SEE THE WORD "GOVERNMENT," SUBSTITUTE, "TAXPAYERS".
►FEDERAL AID, SUBSIDIES, GRANTS ARE PAID FOR BY THE ~~GOVERNMENT~~ taxpayers
►WHEN ANYONE GETS "SOMETHING FOR NOTHING" FROM WASHINGTON, D.C., IT'S THE ~~GOVERNMENT~~ taxpayer THAT FOOTS THE BILL!
►"OH, LET THE ~~GOVERNMENT~~ taxpayers PAY FOR IT!"
►"WHY WORRY ABOUT WASTE? IT JUST COMES OUT OF THE ~~GOVERNMENT'S~~ taxpayers' POCKET."
►POLITICIANS WIN VOTES BY PROMISING TO GIVE AWAY MORE OF THE ~~GOVERNMENT'S~~ taxpayers' MONEY.
UNO WHO
REG MANNING
One of a series by the West's Pulitzer Prize Winning Cartoonist for your MONTANA POWER CO.

Oh Say, Can You See - ?
By Reg Manning
WHEN THE GOV'T GOES INTO BUSINESS, IT DOESN'T "SELL FOR LESS"—IT JUST SPLITS THE BILL—
CHARGE FOR GOV'T SERVICE
TAXES TO MAKE UP DEFICIT
WHATCHA MAKIN' ME PAY FOR? I DIDN'T GET TH' SERVICE!
UNO WHO
REG MANNING
One of a series by the West's Pulitzer Prize Winning Cartoonist for your MONTANA POWER CO

Oh Say, Can You See - ?
By Reg Manning
GEORGE WASHINGTON WOULD TELL HIM —
THAT'S A POOR WAY TO HARVEST CHERRIES!
WAGES
PROFITS
TAX DOLLARS
BUSINESS
RESTRICTIVE TAXES
OVER-ENTHUSIASTIC LAWMAKERS
REG MANNING
One of a series by the West's Pulitzer Prize Winning Cartoonist for your MONTANA POWER CO.

The editors wish to thank the Montana Power Co. for permission to reproduce these three cartoons from Reg Manning's pen. So many utilities have expressed interest in the series that arrangements have been made to make the cartoons available to other utilities at a favorable price, for use in newspapers, utility house organs or employee publications. For details write Harris & Love Inc., 1515 Walker Bank Bldg., Salt Lake City 11.

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ELECTRICAL WEST

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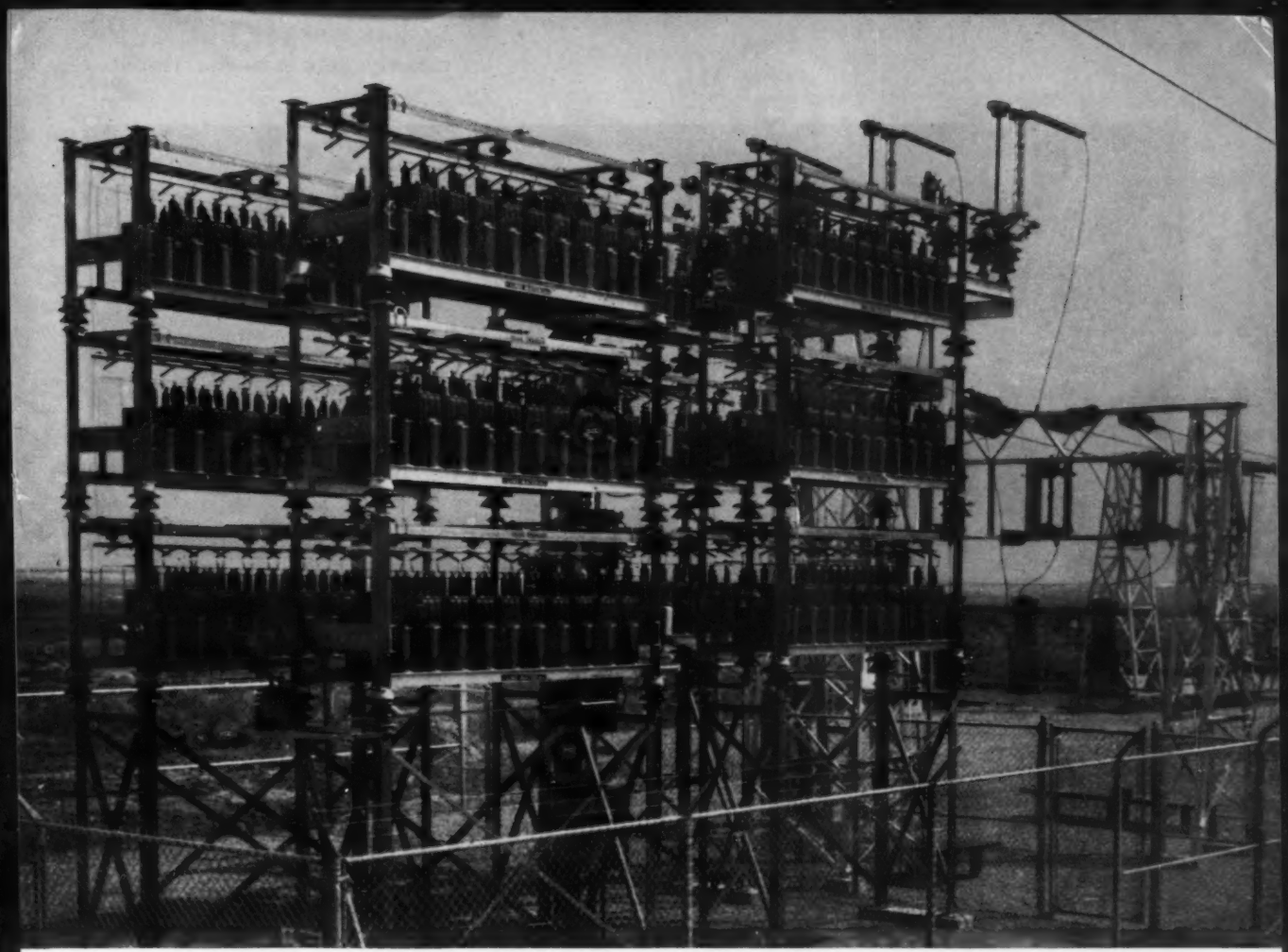


46 kv, 21,600 kvar step-switched capacitor bank at Utah Power & Light Company's Terminal Substation, Salt Lake City. This bank is step-switched by the L-M Voltage Divider Switching scheme, which utilizes a number of low-cost, 15 kv remote control oil switches, on all but the first step. (Photo by R. J. Norton)

L-M VDS Bank Provides Economical Capacitor Switching for Utah P&L Co.

L-M's Voltage Divider System permits substituting low-cost L-M 15 kv oil switches for other, more costly methods of step-switching large capacitor banks.

Line Material's Voltage Divider Switching method uses L-M's NR 15 kv remote control oil switches on all but the first step. A large number of switches is required, but since they are relatively inexpensive, the total switching cost is far less than with other methods.

Utah Power & Light Company recognized a need for reactive supply when local generation was off and the Salt Lake City load was heavy. The Terminal Substation capacitor bank was installed to supply such power. Use of the L-M VDS system provided a low cost method of switching. The installation accomplished the purpose for which it was designed.

Ask for Technical Paper on VDS

Ask the L-M Field Engineer for information on the L-M VDS method—and for copy of a technical paper on the subject. He will also be glad to tell you about L-M's outstanding line of secondary, industrial, 25, 50 and 100 kvar capacitors; and about L-M's Capacitor Application Engineering Service. Or write Line Material Industries, Milwaukee 1, Wisconsin.

LINE MATERIAL® Industries

McGRAW-EDISON COMPANY

472

Elemex® Capacitors

McGRAW EDISON

DISTRIBUTION TRANSFORMERS · RECLOSERS, SECTIONALIZERS AND OIL SWITCHES · FUSE CUTOUTS AND FUSE LINKS · LIGHTNING ARRESTERS · POWER SWITCHING EQUIPMENT
PACKAGED SUBSTATIONS · CAPACITORS · REGULATORS · OUTDOOR LIGHTING · LINE CONSTRUCTION MATERIALS · PORCELAIN INSULATORS · FIBRE PIPE & CONDUIT

Unit No. 1 of South Bay Power Plant, newest and largest steam-electric generating unit of the San Diego Gas & Electric Company

THAT SAN DIEGO!

That California! How it grows—nearly three times as fast as the rest of the nation! But that San Diego area has been growing almost twice as fast as the rest of California!

But think of all it has: climate, scenery, tourist attractions, higher education, military installations and industry.

From the big Camp Pendleton Marine Corps Base on the north, this region of dynamic population growth extends along the Pacific to Mexico. Clustered around the City of San Diego are historic missions, Balboa Park's world famous zoo, seven institutions of college learning, and a total of 18 army, navy and air force installations.

Along the power lines of the San Diego Gas & Electric Company are 24 distinct industrial areas. Much of it is airborne enterprise: aircraft and missile. The 329,113 electric customers, both residential and industrial, used 2.6 billion kilowatt-hours during 1960, 11.7 per cent more than the previous year.

To meet the increasing demand for electricity, San Diego Gas & Electric last year put Unit No. 1 of its South Bay Power Plant into operation, raising the system's generating capacity 142,000 kilowatts to a total of 809,000 kilowatts. Unit No. 2, with equal capacity, is scheduled for completion next year.

Because this new and handsome plant is located at the water's edge, it is painted with three shades of metal gray Subox Paints to blend it in with its surroundings. Thus, anti-corrosive Subox gives the plant both protection and decoration. If you're down that way, be sure to look at it. It's worth seeing.

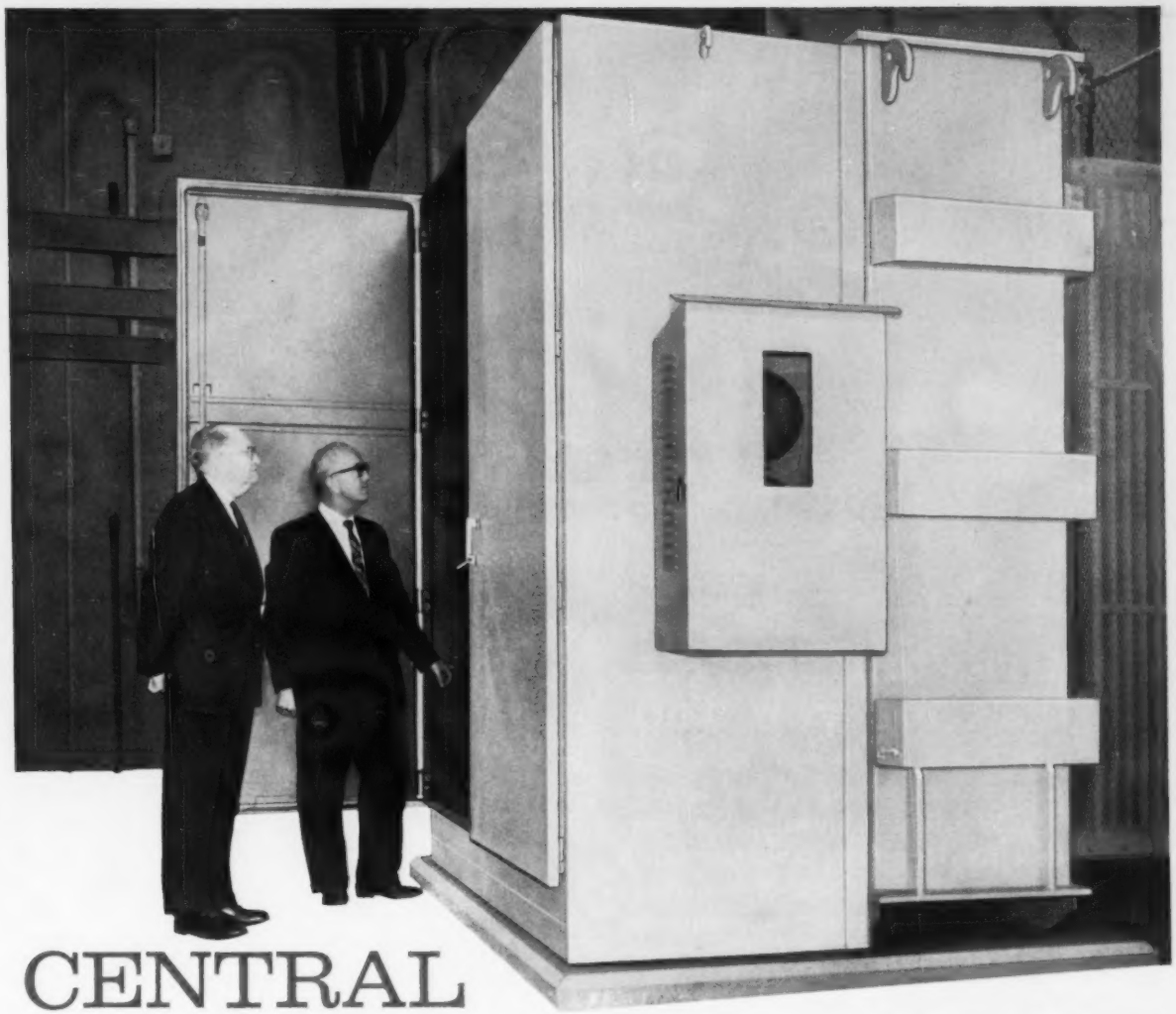
SUBOX PAINTS

Subox Inc.
Trade Mark

Main Office & Plant, 18 Fairmount Park, Hackensack, N. J.

AFFILIATED PLANTS: Canada, Mexico, England, Belgium, Switzerland, Austria, Australia, New Zealand.

For phone number of closest representative see advertising index in back of book.



O. B. Ashmore, Senior Engineer, and Lowell Baker, Department Head, Operating Division, for Dallas Power & Light Company, inspect newly installed Pad Mounted Central power transformer.

CENTRAL 1500 KVA Pad Mounted Transformer

NOW IN SERVICE ON DALLAS POWER & LIGHT COMPANY'S SYSTEM

This Pad Mounted power transformer, with its neat appearance, compact size, and tamper proof features, solved a space problem for Dallas Power & Light Company. The Central unit shown above is a 1500 kva, 3-phase power transformer rated 13200 delta primary to 240 delta secondary. It is complete with a free standing outdoor enclosure, with two hinged doors enclosing bushings, lightning arresters, high voltage fuses, pot-heads, gauges, valves and current transformers.

CENTRAL CTC

Sales Offices in Principal Cities

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Telephone JEfferson 4-5332

PINE BLUFF, ARKANSAS

Plants at Pine Bluff, Arkansas, and Arcadia, Florida

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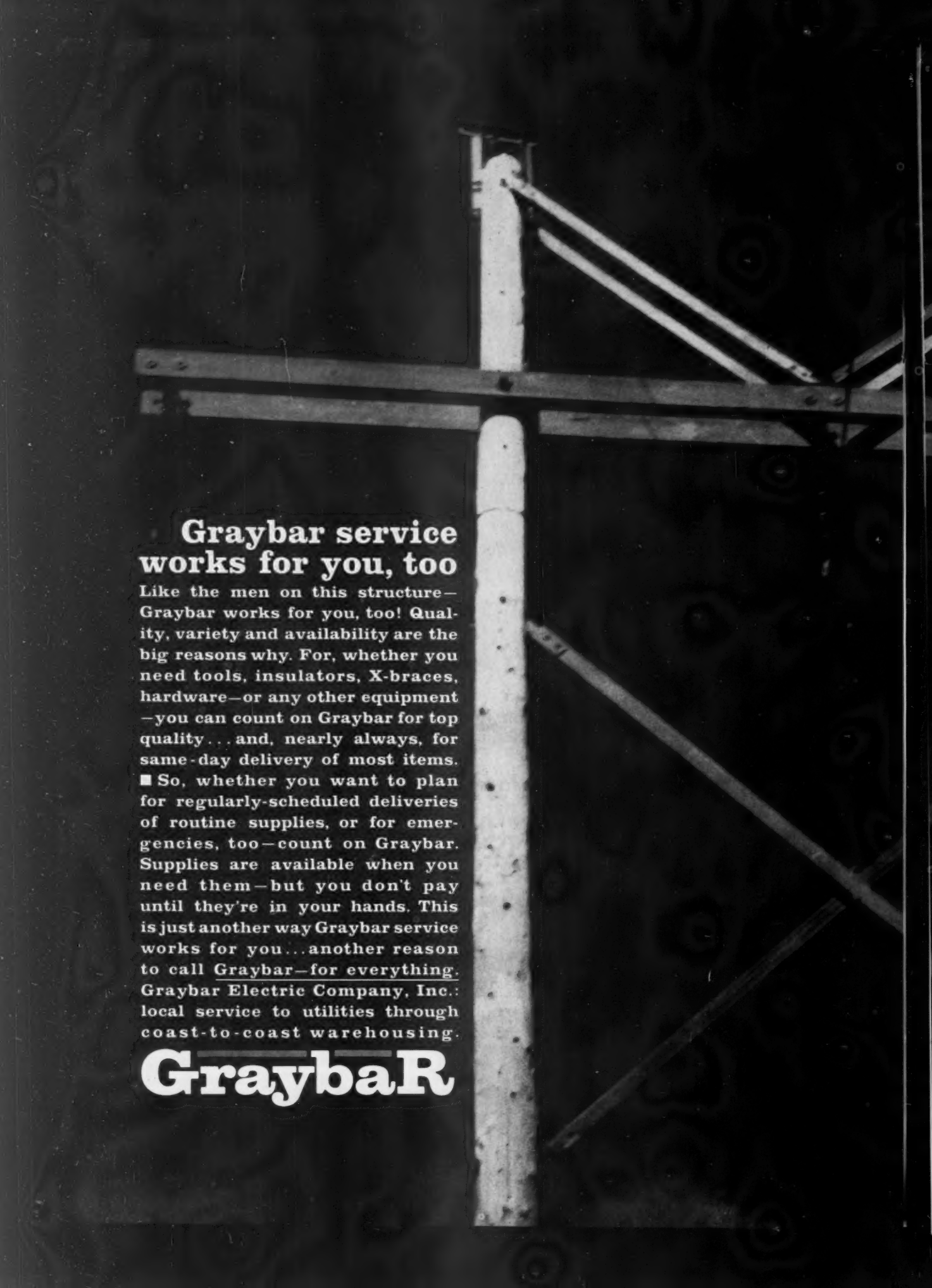


Graybar service works for you, too

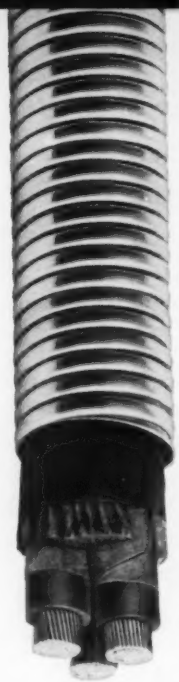
Like the men on this structure—Graybar works for you, too! Quality, variety and availability are the big reasons why. For, whether you need tools, insulators, X-braces, hardware—or any other equipment—you can count on Graybar for top quality . . . and, nearly always, for same-day delivery of most items. ■ So, whether you want to plan for regularly-scheduled deliveries of routine supplies, or for emergencies, too—count on Graybar. Supplies are available when you need them—but you don't pay until they're in your hands. This is just another way Graybar service works for you . . . another reason to call Graybar—for everything.

Graybar Electric Company, Inc.: local service to utilities through coast-to-coast warehousing.

GraybaR

"Circloc" Interlocked Armored Power Cable

NOW AVAILABLE IN DIAMETERS TO 4 INCHES



With our newest armored cable machine in full production, Circle customers can now get high quality Circloc interlocked armored power cable in diameters up to 4 inches—the most complete range of sizes available anywhere. This recent addition to its modern manufacturing facilities is Circle's answer to the growing need for larger diameter armored cable for power distribution.

Circloc cable can be supplied with 2, 3 and 4 conductors with varnished cambric or butyl rubber insulation and voltage ratings of 600 to 15,000 volts. Armor is available in interlocking galvanized steel, aluminum or bronze.

For your next power cable installation, be sure to specify compact, dependable Circloc interlocking armored cable.

CIRCLE WIRE & CABLE CORP.

SUBSIDIARY OF **CERRO CORPORATION**

PLANTS: Maspeth and Hicksville, N. Y **SALES OFFICES & WAREHOUSES:** In all principal cities.

Rubber Covered Wires & Cables • Varnished Cambric Cables • Plastic Insulated Cables • Neoprene Sheathed Cables • "CIRTUBE" EMT

WHY TRIM TREES? IT'S EASIER TO TRIM COSTS!

Olin Conductor's Spaced Aerial Cable Systems—

* COMPRESTO CABLES
* PLM'S ALUMINA SPACERS and
* SHERMAN-REILLY'S CONTINUOUS STRINGING SYSTEM

—can save you money!

Don't cut your consumers' precious trees!

Don't pay needless money for future tree trimming!

Don't use old-fashioned methods for installing modern spaced aerial cables!

DO contact your Olin Conductor representative for immediate information!

Olin CONDUCTORS

METALS DIVISION, OLIN • P. O. BOX 989 • CHATTANOOGA, TENN.

For phone number of closest representative see advertising index in back of book.

American Steel and Wire
Division of
United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Alabama, Southern Distributors
United States Steel Export Company, Distributors Abroad

Cut corners with flexible USS Armorlokt Cable

Remember your last conduit job . . . all the time and work needed to install junction boxes, not for new circuits but just so the cable could be pulled around corners? And the longer the pull, the more boxes you needed. USS Tiger Brand Armorlokt Cable could have been installed in approximately one-half the time and eliminated all that expensive pipe fitting and bending. ■ Armorlokt installs as easily as ordinary cable—yet it protects as well as rigid conduit, and sometimes even better because Armorlokt is flexible and "rolls with a punch." You can install it anywhere . . . up, down, across walls, buried in the ground, suspended in trays or on cable rings, indoors or outdoors. Armorlokt can be installed in long lengths, because its flexible construction permits easy and quick bending around corners, I-beams, or any other obstruction. And you can easily splice into Armorlokt Cable, anywhere along the entire length. ■ Armorlokt has a higher current-carrying capacity than the same size conductor in conduit because heat is quickly dissipated, not trapped inside. Corrosive atmospheres are no problem. Armorlokt is available with galvanized steel, stainless steel, aluminum or bronze armor. It's also available with an Ampyrol (PVC) jacket, in black or colors for easy identification. You can order Armorlokt with almost any kind of insulation, including varnished cambric, rubber, or asbestos up to four inches in diameter, rated 15,000 volts. ■ There's a standard USS Tiger Brand cable for every special job. For the complete story on Armorlokt Cable or any other type cable, call our nearest sales office or write American Steel and Wire, Dept. 1236, Rockefeller Building, Cleveland 13, Ohio.

USS, Armorlokt and Ampyrol are registered trademarks

CONFIGURATION in your power plant

The configuration of semi-outdoor installations typifies the economics of design incorporated in Stearns-Roger built steam power plants. From 75 years of service to industry, Stearns-Roger provides complete engineering and construction of efficient power facilities. Your power plant is our business.

Stearns-Roger
THE STEARNS-ROGER MFG. CO. • DENVER, COLORADO
ENGINEERING CONSTRUCTION MANUFACTURING

P. O. Box 5888 • Denver 17, Colorado

★ "The relative disposition of parts" —Webster

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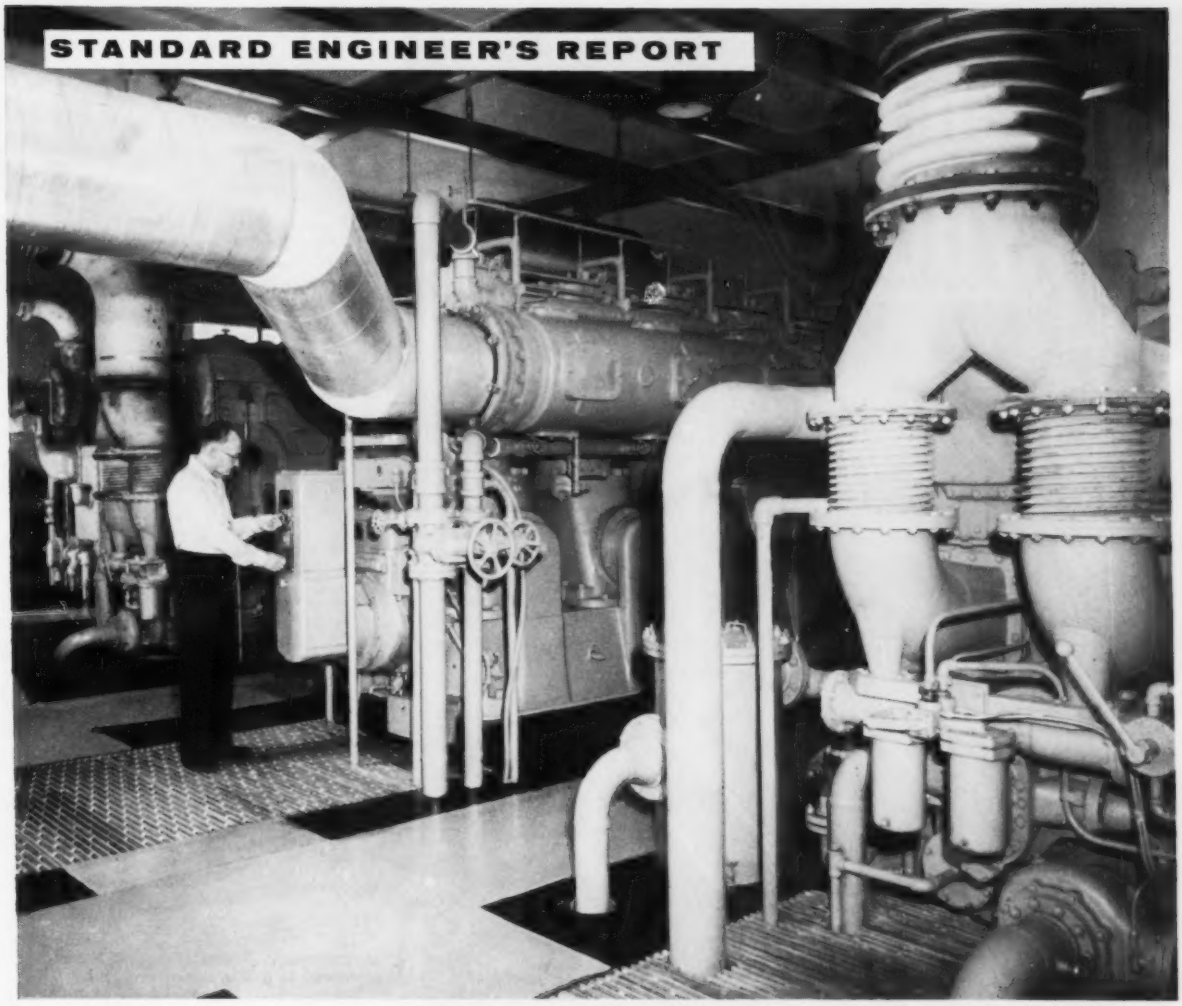


Maintenance costs cut 60% using RPM DELO Oil

The Municipal Power Plant, West Bend, Iowa operates four diesel engines generating over 4 million hours of electric power a year. Since 1945, RPM DELO Oils have done an outstanding lubrication job . . . extended overhaul periods, and reduced maintenance costs by 60%.

Plant Superintendent N. P. Cuplin reports: "At the last major overhaul of our 1400 hp. Fairbanks Morse diesel, average wear on ten cylinder liners was only .007 after 4½ years of continuous operation. This is one third of normal wear. Interior parts were clean and unclogged.

"We tried a number of other products before we settled on RPM DELO Lubricating Oil. We've not only cut maintenance expense but have reduced fuel costs too, because RPM DELO's higher cleaning ability has allowed us to use a lower gravity diesel fuel oil."

RPM DELO OIL reduces wear and prolongs engine life because it clings to parts whether engine is running or idle. An anti-oxidant fights gum and lacquer formation, special detergent keeps parts clean. Other additives prevent bearing corrosion, crankcase foaming.

Why not try RPM DELO Oil? Let it cut costs, lengthen equipment life. Contact your local representative or write 225 Bush St., San Francisco 20, California.

LUBRICATING OILS RPM DELO

STANDARD OIL COMPANY OF CALIFORNIA

TRADEMARK "RPM DELO" AND CHEVRON DESIGN REG. U.S. PAT. OFF.

ROYAL Portable Cords

Open a carton of Royal portable cord and you *know* you're getting the easiest handling, fastest working cord available anywhere. Flex it, crimp it, strip it . . . and you can see why Royal cord meets *all* your job requirements for flexibility, safety, and durability. Royal's reputation for quality and dependability rate Royal Cords *first* among electrical men from coast to coast. Your wholesaler has a complete range of cord types and sizes — rubber, neoprene, plastic jackets — fixture wires, lamp cords — thermo cables, coaxial cables, bell and machine tool wires, and more. They're made right, packaged right, priced right—start to use them today!

ROYAL ELECTRIC ...an associate of ITT

ROYAL ELECTRIC CORPORATION
PAWTUCKET, RHODE ISLAND

In Canada:
Royal Electric Company (Quebec) Ltd., Pointe Claire, Quebec

SALES REPRESENTATIVES AND WAREHOUSES: Los Angeles—1950 Naomi Avenue, RI 7-9655; San Francisco—1225 Sixth St., HE 1-5792; Seattle—4130 First Ave., So., MA 3-8882; Phoenix—221 E. Camelback, CR 7-1662 Denver—110 Yuma, SH 4-1351

LETTERS

To the Editor:

Thank you very much for sending me the two copies of ELECTRICAL WEST July issue. I thought your selection of stories on the heat pump was excellent . . .

I note one statement on p 60 with which I believe almost any heat pump manufacturer would disagree.

"Once it is assumed that some form of cooling will be installed it can be said that the cost per ton for a standard air conditioning unit will just about equal the cost per ton of a heat pump. Thus, the heating plant is free and the economic study shifts to the matter of fuel costs."

We have generally stated that the cost of a heat pump is approximately equal to the cost of a heating plus a cooling system. There is definitely additional engineering caused by more complex electrical circuitry . . .

Henry F. Colton
Carrier Corp., Syracuse, N. Y.

To the Editor:

Thank you very much for sending me the picture and copy of ELECTRICAL WEST. I was indeed interested in reading many of the articles, and especially the one on public power. This article should be mailed to all voters in this country.

Gordon S. Heylin, President
Utilities Line Construction Co. Inc.
Jenkintown, Pa.

To the Editor:

I have just finished reading the article "The Turn to the Left" in the June issue of ELECTRICAL WEST. It's good but sure is ominous. Can I get some reprints?

We have the laboratory here really working. Too busy now even to take time out for a formal dedication. That will have to come later. But it is going well and we are gaining recognition—which is good.

Clarence H. LeVee
Vice President, Engineering
A. B. Chance Co., Centralia, Mo.

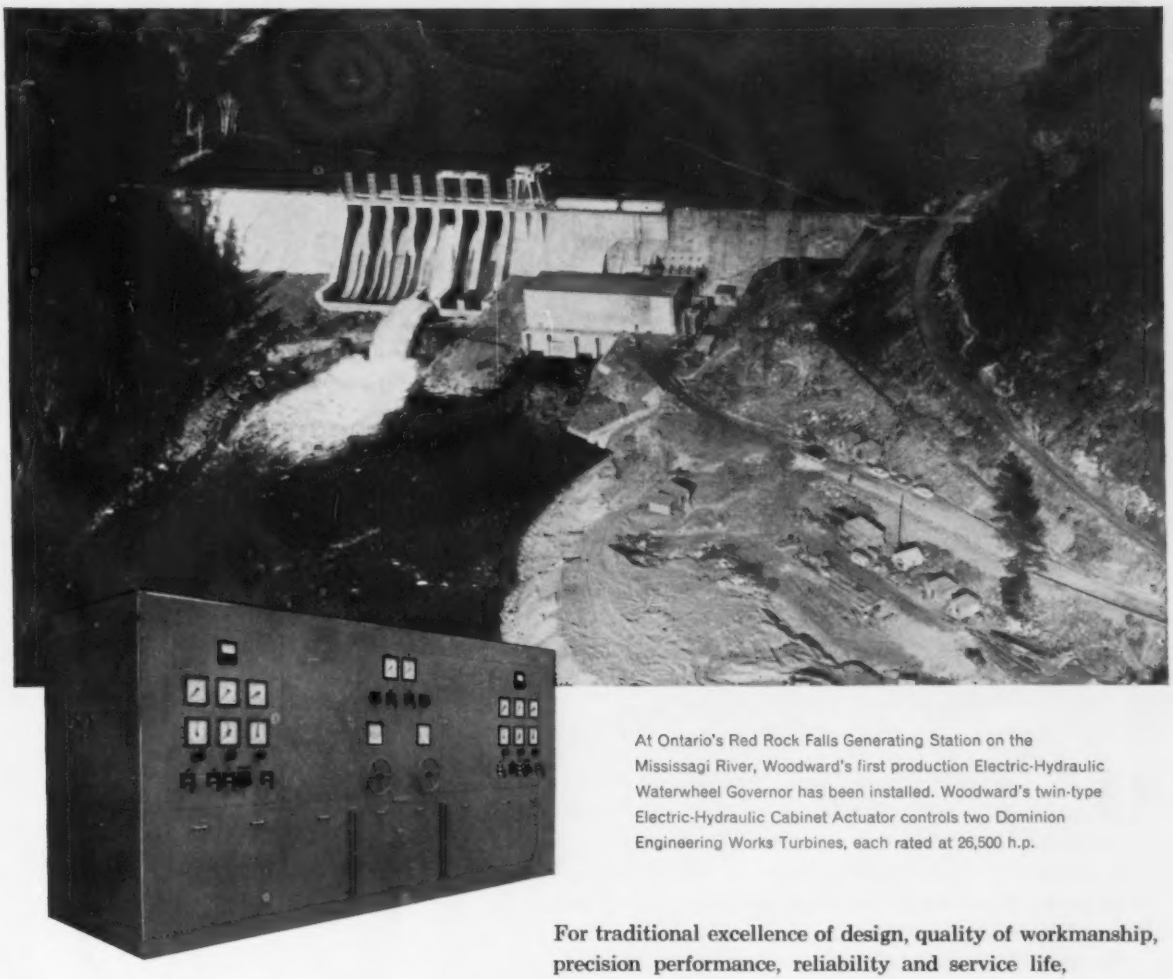
To the Editor:

A friend of ours, who is an employee of the PG and E here in Willows, brought us the picture of the Wagner motor, 1899 model, which was in your June issue.

He knew that we have one of these motors in use in our sausage kitchen. My father installed this motor in 1902 and it was used on a one-ton refrigeration compressor. This was, by the way, the first mechanical refrigeration plant in this county; and during the power shortage in 1920 it would run sometimes all night on the brushes, but she never burnt out. Our temperatures here run above 110 every once in awhile and you can see how great the need was for refrigeration in those days!

In 1920, we built a new building and then installed a larger plant, so put the Wagner in the sausage kitchen to spend her declining years. She only works a few hours each week now, but is still tops . . .

W. A. Weinrich
Willows Meat Co., Willows, Calif.



At Ontario's Red Rock Falls Generating Station on the Mississagi River, Woodward's first production Electric-Hydraulic Waterwheel Governor has been installed. Woodward's twin-type Electric-Hydraulic Cabinet Actuator controls two Dominion Engineering Works Turbines, each rated at 26,500 h.p.

DEBUT
at Red Rock Falls

Woodward introduces new Electric-Hydraulic Waterwheel Governor

For traditional excellence of design, quality of workmanship, precision performance, reliability and service life, Woodward Mechanical-Hydraulic Governors have long been the standard of the world. To these qualities are now added the simplicity and versatility of electric speed sensing with Woodward's new Electric-Hydraulic Cabinet Actuator. Such mechanical devices as the ballhead assembly and temporary droop dashpot are supplanted by static electrical components that offer advantages for certain plants — (1) continuous control signals can be used with particular benefit on fringe control, (2) greater flexibility in arrangement of equipment is possible because electrical controls can be remotely located from the distributor valve assembly, and (3) operating and maintenance personnel are already familiar with similar electrical equipment in other plant functions.

For the finest in prime mover control, always specify Woodward waterwheel governing equipment — either electric-hydraulic or mechanical-hydraulic.

"Worlds oldest and largest manufacturer of hydraulic governors exclusively"

H-107

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First from General Electric (1959)...another bright idea that became a better lamp for you

G-E All-Weather Fluorescents shine brighter when mercury drops

Mister Magoo says . . . "1959? A chilly year! Alaska joined the Union, and General Electric invented the All-Weather fluorescent. Happy birthday, All-Weather. Humph! Packaging experts! Who needs a wrapper on a pool cue?"

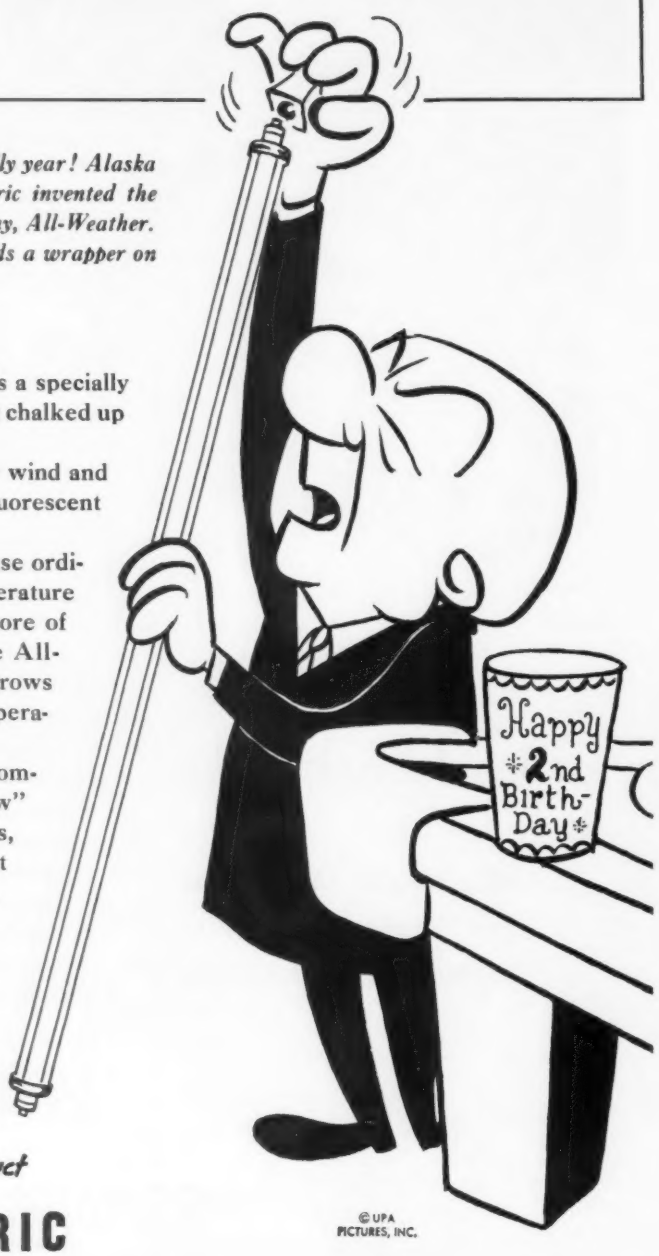
DON'T drop your cue, Mister Magoo. It's a specially jacketed All-Weather lamp, another first chalked up by General Electric.

It wears that glass jacket to ward off winter wind and cold. Below freezing, it's the most powerful fluorescent lamp your customers can buy.

General Electric developed this lamp because ordinary fluorescents grow dim when the temperature dives toward zero. Often they lose 90% or more of their warm-weather light output. But the All-Weather fluorescent T10J—a G-E exclusive—grows brighter the colder it gets! Use it where temperatures sometimes drop below 40°F.

Your customers can use the T10J—or its companion lamp (T10) without the "storm window"—indoors or out. Examples: walk-in freezers, shopping centers, drive-ins, parking lots, street lamps, store fronts, airports, docks, signs, gas stations.

Both come in 4', 6', and 8' lengths. Ask your G-E distributor to show you these two exclusive examples of General Electric lighting leadership. General Electric Co., Large Lamp Dept. C-111, Nela Park, Cleveland 12, Ohio.



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21 years ago, the **Niagara Mohawk Power Company** specified Burndy MOLEs for their underground modernization program. Specifications called for a connector that would perform without fault, under prolonged exposure to dampness, oils, extreme temperatures, and last the life of the cables connected. The MOLEs met all specifications, and are as good as new today ... proof beyond doubt that Burndy MOLEs have the high quality necessary for underground systems.

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If you are considering "going underground", or expanding your present system don't take a chance on costly burnouts and disrupted service, call your local Burndy representative ... he has had years of underground experience and can help you get maximum dependability and flexibility in your underground system.

Photo from Niagara Mohawk Power's file, dated 1938, showing actual installation of MOLE in its underground system. These same MOLEs are in operation today, after 21 years of trouble-free performance.

BURNDY

59-19

ELECTRICAL CONNECTORS

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In the West: Shaffer & Nelson, Inc., 1415 S. Main St., Salt Lake City 15, Utah HUnter 4-3382

NEWS

Edited for the electrical industry of the West

House Kills NPR Power

As this issue went to press, NPR power facilities were again before the House, the Senate having voted 54 to 36 to reinstate the provision in the bill.

On July 13, the House of Representatives voted 184 to 140 to delete $95 million from the current appropriations bill for conversion of the new production reactor at Hanford to the by-production of electricity.

The $145 million reactor is now under construction at Hanford and is being built in a manner that would permit the addition of electrical generating facilities for the added $95 million if approved by Congress.

Senator Henry M. Jackson (D-Wash.), a member of the joint committee on atomic energy, has assured Charles F. Luce, Bonneville Power administrator, that an all-out fight for the reactor conversion would be made in the Senate.

The joint committee had reported favorably on the conversion and included it as an item in the 1962 AEC authorization bill.

Luce stated that authority to build the reactor in such manner that it could be converted was passed in 1958, after first being killed in the House. The House originally rejected a $25 million item for convertibility features and the Senate restored this amount. The Senate version prevailed in conference, and both House and Senate accepted the conference bill.

Debris Control Planned

Grant and Chelan PUDs have joined in a cooperative, cost-sharing agreement with three government agencies—USBR, National Park Service and Corps of Engineers—to construct debris control facilities on the Columbia River above Grand Coulee Dam in Washington State.

The Bureau of Reclamation will assume responsibility for building, operating and maintaining the debris-control facilities on Franklin D. Roosevelt Lake (the Grand Coulee Dam reservoir). Costs will be borne on a prorated basis by dam operators, using the ratio of their installed capacity to the total installed capacity on the river. The action resulted from recommendations of the Columbia Basin Interagency Committee last year. The CBIAC had set up a subcommittee to study the problem. Floating debris on the river has been termed a growing problem and a menace to recreation, navigation and hydroelectric power production.

Colorado Merger Discussed

Public Service Co. of Colorado and Colorado Central Power Co. have renewed discussions of a possible merger. Colorado Central, which has no power-generating facilities, serves several Denver suburban areas with power purchased from Public Service.

R. T. Person, president of Public Service, said in a statement that "from the viewpoint of our company, we would be interested in such a merger, providing it could be arranged on an equitable basis for our stockholders." Person said such a merger proposal would have to be presented first to company directors and then to stockholders.

► **Electrical West commends** R. J. McMullin, general manager of the Salt River Project, for the program presented in his letter to employees, "What About Communism?" in the June issue of the *Current News*. To help employees, their families and friends to become informed on the menace of communism and how to combat it, the utility is sponsoring a study group, Project Employees for America. Films, tape recordings of speeches presented at the Phoenix Anti-Communism School and occasional outside speakers or recordings are being presented at meetings Monday and Tuesday evenings in the Employees Recreation Area. Library and other reading material is also being made available.

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Nuclear vs Steam Power Costs

A difference of opinion as to when electrical power generated from nuclear sources might become competitive with steam-generated power was expressed at two recent meetings in Seattle.

Charles F. Luce, administrator of the Bonneville Power Administration, was the first to mention the subject. At a Chamber of Commerce meeting, he pointed out that the Pacific Northwest cannot count on hydroelectric power to fill its needs after 1975. Unless there is an unforeseen breakthrough in the quest for economically competitive nuclear power, the area will be forced to turn to steam-generated power, fueled by coal, Luce said. BPA estimates that nuclear power cannot compete on even terms with power generated by other steam methods before 1985.

Eugene C. Starr, BPA's chief engineer, expressed pretty much the same opinions at a symposium on nuclear energy at the University of Washington, although he admitted that nuclear power might become competitive in about 15 years.

Even this time interval seemed too long to Wilfrid E. Johnson, manager of General Electric Co. operations at the Hanford Works, also participating in the symposium. Johnson offered to bet Starr that a nuclear-power plant could make a firm bid on power, at a price competitive with coal plants, within five years.

Luce, although dubious as to the economic feasibility of nuclear power, lauded the power facilities proposed for the new dual-purpose Hanford reactor as an important defense safeguard. A dual-purpose reactor, if kept in operation for production of electricity, could be reconverted to plutonium production in short order, he pointed out.

Spawning Channel Studied

Eugene's Water & Electric Board has agreed on terms of a joint study of an artificial spawning channel built by the utility to replace natural spawning grounds lost in construction of EWEB's 90,000-kw Carmen-Smith project on the McKenzie River.

The artificial spawning facilities design was determined by attempting to duplicate optimum natural

spawning conditions. One hundred or more adult female salmon can be accommodated by the channel. Similar operations in British Columbia and California have indicated that the man-made spawning channel may become an important tool in management of anadromous fish runs in Western rivers where free passage of fish is barred by dams.

The EWEB is financing the three-year study of the fish facilities.

Chemical Lid for Lake

Scientists at Utah State University are seeking means of maintaining a "chemical lid" on lake surfaces to reduce water loss by evaporation.

Success could be meaningful not only to agriculture in the arid West but could greatly hike hydroelectrical generation of power.

The USU group, with the cooperation of Utah Power & Light Co. and USBR, is engaged in aerial spraying of a harmless anti-evaporant on water surface either too large or too rough to be treated from boats.

Experimental area is Bear Lake on the Utah-Idaho border where an estimated 240,000 acre-ft annually are lost by evaporation. This is enough water to irrigate 80,000 acres of crops in a single season.

According to Dr. Vaughn Hansen, director of the engineering experiment station at Utah State, repeated spraying of the anti-evaporant at Bear Lake could save one-fourth of this water loss.

The principle behind the Bear Lake tests is not new. It is that of creation of a monomolecular layer upon the surface of the water to reduce the evaporation. Hexadecanol —a tasteless, odorless, colorless compound harmless to swimmers, boats, plant and fish life—is melted and sprayed by airplane on water surfaces, forming the almost invisible film one molecule thick and measuring six 10-millionths of an inch in thickness.

► Oregon's public utilities commissioner has approved agreement between Pacific Power & Light Co. and the city of Springfield **for sale to the municipal electric system of PP&L facilities in an urban renewal project.** The distribution lines affected now serve 130 customers. Agreed price was $61,000.

► **The Wyoming PSC has approved a joint application** whereby the city of Torrington will transfer to Wyrulec Co., an REA, some of its service areas in the Cherry Creek area southwest of Torrington. Wyrulec will purchase the town of Torrington's electric utility lines and other facilities in the area for $5,000. Torrington has a municipally owned electric utility system.

Comments on New Law

Oregon's new law letting the public utilities commissioner allocate new territories to utilities will have "a decided effect in keeping rates down," according to the man who will enforce it.

Public Utilities Commissioner Jonel C. Hill said the new act doesn't give him power to force utilities to sell or trade territories, but by giving him power over applications for new territory enables him to "encourage" nonduplication.

Portland is not covered by the law.

► Specifications in a recent purchase order by Washington Water Power Co. require that **locally produced aluminum be used** in the 760,000 lb of aluminum conductor it is buying to build its portion of a transmission line between Lewiston, Idaho, and Walla Walla, Wash. The transmission line is a joint project of WWP and Pacific Power & Light Co. The purchase order required aluminum from Kaiser Aluminum & Chemical Corp.'s Mead (Suburban Spokane) reduction works to be used in the conductor, which will be produced at Kaiser's Newark, Ohio, plant.

► **A joint committee to keep an eye on hydro developments in British Columbia** was authorized at the B. C.-Yukon-Alaska conference held in Juneau. Committee personnel will be named by the governments of the three territories. The group will maintain liaison with another joint committee set up last year to study road developments. Fear that hydro developments might flood proposed highway routes led to appointment of the new committee.

► The Walla Walla district of the Corps of Engineers has **combined the resident offices of Ice Harbor Dam and Lower Monument Dam** on the lower Snake River. Leonard G. Estey, who has been serving as resident engineer for the Ice Harbor project, has been named resident engineer for the Ice Harbor-Lower Monumental resident office. Ice Harbor will be completed this year and construction work has just started on Lower Monumental.

GROWTH

City Light Transmission

Contract bids for City Light's Duwamish-Maple Valley transmission line have been called for by the Seattle Board of Public Works. The construction job calls for the building of 230-kv steel and wood-pole transmission line towers and stringing 7.4 circuit miles of cable between City Light's Duwamish substation and the Bonneville Power Administration's new Maple Valley sub.

The board had previously approved the allocation of $19,500 for right-of-way acquisition and $284,000 for construction of the line.

An existing City Light right-of-way and towers which are presently in place will be utilized in the building of the new line which will provide more transmission capacity for an increasing energy usage by City Light consumers. This higher transmission capacity will be used, indirectly, when Boundary project power is provided to the system.

Cougar Bids Rejected

All seven bids received by the Portland District, U. S. Army Engineers, for excavation and construction of the Cougar Dam power house on the South Fork of the McKenzie River have been rejected because they exceeded the government estimate of $1,071,762 by more than 25%.

S and C Inc. and West Coast Electric Co. Inc., Seattle, submitted the low bid of $1,365,594. Bids ranged as high as $1,711,792. The district will readvertise for bids in October.

The power house for the $54.7 million Cougar project will have two generators with a total installed capacity of 25,000 kw, scheduled for operation by November 1963.

► **The new budget** adopted by Los Angeles Board of Water & Power Commissioners for the fiscal year beginning July 1 includes $195,174,000 for the city's power system. New construction activities on power projects are budgeted at $72,810,000. According to General Manager Samuel B. Nelson, approximately $36 million of the power system construction budget is earmarked for the Haynes steam plant and related in-town facilities. Construction start on the Water & Power 17-story general office building is provided for in a $6,948,000 budget appropriation.

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This symbol stands for fusible switch

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THE SAFETY SWITCH THAT CHALLENGES COMPARISON . . .

BullDog's general-duty safety switch!

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. . . plus, all current-carrying parts are silvered. Available in NEMA 1 and NEMA 3R enclosures . . . competitively priced. Challenge our distributors to prove these switches are the finest. Write for details!

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Consult the following Pacific Coast representatives:

Coast Electric & Manufacturing Co.
1733 N. E. Seventh Ave., P. O. Box 7866
Portland 12, Oregon

Young Electric & Mfg. Co.
2134 Curtis St.
Denver 2, Colorado

Safety Switchboard Company
910-89th Avenue
Oakland 21, California

BullDog Elec. Prod. Co. of Los Angeles
3020 Supply Ave.
Los Angeles 22, California

I-T-E CIRCUIT BREAKER COMPANY
BULLDOG ELECTRIC PRODUCTS DIVISION

WASHINGTON REPORT

Truce Is Over

The possibility of federal power development on the lower Colorado River has appeared in new bickering between Arizona Power Authority and the city of Los Angeles over hydroelectric developments on that river.

What appeared to be a truce between the two competing Federal Power Commission applicants over rival plans to build the huge Bridge Canyon and Marble Canyon projects now seems to be a thing of the past.

First shots in the newly aroused hassle have come from both the Los Angeles Water & Power Department and the Metropolitan Water District of Southern California. The two are opposing Arizona's plan to build a 510,000-kw Marble Canyon project as inadequate. And they strongly recommend that the federal government consider building the project—plus a mammoth Kanab Creek extension—as an alternative.

The two California agencies claim Marble Canyon isn't "best suited" to the Colorado River in the vicinity of Grand Canyon National Park because it won't develop the head in and through the national park. An alternate plan, using a 44-mile concrete tunnel from Marble Canyon to the mouth of Kanab Creek on the northwestern edge of the park, could utilize this head, the two opposition intervenors claim. And this Kanab Creek alternate probably would have to be built by the federal government (probably Bureau of Reclamation) because of the expense.

The Kanab plan has staggering details: a cost of $1,095,388,000; a rated power capacity of 2,030,000 kw; a peaking capability of 2,300,000 kw; construction of a 44-mile, 36-ft concrete-lined tunnel, at one point about a mile below the surface. The Kanab Creek power house would have seven 215,000-kw generators and three 167,000-kw generators; and a single 30,000-kw unit would be installed at the upstream Marble Canyon Dam to operate on water flows left in the Colorado River—not diverted downstream to Kanab via the tunnel.

The California plan would give Los Angeles and the water district 1,505,000 kw of the Kanab Creek capacity, Arizona 531,000 kw.

Sheer cost and construction problems suggest federal development of the Kanab Creek scheme. And both Los Angeles and the water district want the federal government to look into the plan. They want the FPC to delay hearings until Congress can study it.

The Kanab plan wasn't filed as a competing application against Arizona's Marble Canyon application, however, and the Arizona attorney has asked the FPC examiner to throw out the alternate Kanab plan because of its "complete absence of any bearing" directly on Marble Canyon. "The whole thrust . . . is to seek delay . . . in order allegedly to permit further study of the Kanab diversion scheme preliminary to taking of a position on possible federal construction," he charged in a motion to strike.

The FPC examiner, William J. Costello, however, left the commission in mid-July, and a new examiner will rule on Arizona's motion. Hearings have been postponed in the case until Sept. 12, and the new examiner may not rule until that time.

The California intervenors figured Kanab's cost at a 2.623% interest rate—same used for the federal upper Colorado projects. Generating facilities, on this basis, would cost $698,-301,000; transmission lines would cost $145,467,000. The Kanab plan envisions a high-voltage (380 kv) connection with the Bureau of Reclamation's grid near Hoover Dam.

Senate to Study Fuel Needs

The nation's fuel and energy needs are almost certain to come under study by the Senate during the next two years. Only question is whether this will be done by a special senate committee or by an established subcommittee of the senate interior committee.

A special senate committee, geographically balanced, has been proposed by 63 senators (45 Democrats, 18 Republicans), calling for a two-year study at a cost of $200,000, to be completed by Jan. 1, 1963.

This study would cover coal, oil, gas, atomic energy and hydro power. Support for the study has come from the Kennedy administration, the AEC, FPC, labor groups and at least one utility executive: Board Chairman Philip Sporn of American Electric Power.

Interior Secretary Udall said the study should be a "long-range study, a balanced study" which will use "as its yardstick the enlightened long-run good of the country as a whole." Udall asked also that the study include "low-cost energy supplies" as one of its goals: "the most productive use and low rates to consumers through optimum utilization of present and future advances in transmission and generating technology."

Sen. Ernest Gruening (D-Alaska) also has insisted that the study give as much space to hydro power as to coal. The original impetus for the study came from coal area offices, and Sen. Jennings Randolph (D-W. Va.) was initial sponsor of legislation to create the study.

One Approved, One Delayed

The House interior committee has approved construction of the federal Fryingpan-Arkansas diversion and power project, Colo., but appears ready to sit on its continuing controversy—Burns Creek Dam, Idaho—until 1962.

The house unit approved Fryingpan by a 19-4 vote, sending it to the house rules committee. Fryingpan would cost $170 million, divert water from the Fryingpan Valley of the Colorado River basin through the Continental Divide into the Arkansas River Valley near Leadville, Colo. Generating capacity of 123,900 kw would be installed on the Arkansas River in several locations.

The $50 million, 90,000-kw Burns Creek project has been bottled up in the committee's irrigation and reclamation subcommittee by the principal efforts of Rep. John Saylor (R-Pa.), and probably won't come up for consideration until early next year.

The Senate interior committee has completed hearings on Burns Creek but hasn't acted on it. No hearings have been held on Fryingpan on the senate side, and the House of Representatives will have to approve the latter project before the senate committee takes up debate on it.

► **A new policy for setting fees for rights-of-way** across federal lands has been announced, but not fully defined, by Interior Secretary Stewart Udall. The new policy calls for fees based on "fair market value," to be determined by the Bureau of Land Management's appraisal department. Under any circumstance, value will be no less than $5 per acre, and periodic adjustments may be made at any time after the first five years of new fee contracts. BLM Director Karl Landstrom says the new fee schedules should be "revenue producing," and not based strictly on land-recovery costs. The new policy will replace the present method of setting a fixed charge.

NEW PG&E UNITS PIPED BY MIDWEST

Pacific Gas and Electric Company, serving the rapidly growing region of Northern and Central California, has added 3,615,500 KW of steam plant capacity since World War II alone. Another 720,000 KW is scheduled for completion by mid-1963. Midwest is proud to have been the piping fabricator and/or erector for most of the new or expanded plant capacity completed to date or under contract, and to have been selected as the fabricator and erector for PG&E's newest project—units 3 and 4 at Morro Bay Station. In all, PG&E will have 26 generating units in 7 plants benefiting from power piping by Midwest!

For an illustrated booklet on Midwest's capabilities in piping, write for Bulletin 60B, POWER AND PROCESS PIPING.

PG&E's new 1,320,000 KW Pittsburg Power Plant. At left are units 5 and 6 (660,000 KW) for which Midwest recently completed the piping fabrication and erection.

Division of Crane Co. / *1450 South Second Street, St. Louis 4, Missouri*

MIDWEST PIPING

6144

COMMUNICATIONS

Signaling Regulations

A summary of power radio service tone signaling functions has been prepared by NCUR's Engineering Practices Subcommittee and will be distributed to members of the sponsor groups. While part 11 of the regulations covers the rules for operation, it does not go into details particularly pertinent to electric utility operations.

The summary lists a number of alarm functions that are believed to be permissible, such as: circuit breaker operations and reclosures, transformer high temperatures, oil levels, gas pressures, abnormal voltage, emergency power failures or operation of emergency power units, loss of station service, tower light failure, low air pressure or pneumatic OCB operating mechanisms, high bearing temperatures, etc.

Control functions that would appear to be permissible are: switch control whereby power can be supplied to an area in trouble, capacitor bank control for use in correcting abnormal voltage conditions, switching in service stand-by transformer capacity in a substation to prevent overloading of equipment which could result in a power outage. These are only a few of the potential uses, but they should serve to stimulate the imagination.

► The Navy has announced that regular operation of the **world's largest radio station** started in June. Fortunately, it is located in Maine, but its power of two megawatts should cover the West as well as the Atlantic where it is intended to provide interference-free communication to naval vessels. The Jim Creek station in the Northwest effectively blocked the use of carrier circuits in the vicinity of 15 kc when it went into operation, so the New Englanders are to be sympathized with.

► **The FAA,** in what is probably a well intentioned move to safeguard air traffic, has issued a new regulation which will cause more delay in obtaining construction permits. Briefly, it would require a month's notice to the FAA before filing an application involving a tower height of more than 150 ft, any structure within a glide path, etc. As a result of this regulation and the existing one requiring a pre-grant waiting period, it will be as long as two months plus before an application can even reach the FCC. If a few more governmental agencies can find a way to get in the picture, it probably will become impossible to get an application filed. Anyway, it seems likely that there will be many objections to the regulation, and it may even be streamlined some.

► Once again the **small forfeitures bill** has been passed by the Senate at the request of the FCC. The same thing happened last year, but the House never acted on the bill. Briefly, the bill would enable the FCC to levy forfeitures ranging from $100 to $500 for certain violations of the regulations. As the law now stands, the penalties are so severe as to make it unreasonable to invoke them for minor infractions. In addition, the bill will permit renewal of authorizations earlier than the existing 30-day limit. You have no doubt noticed that renewals are seldom received any more before the expiration date of the existing authorization.

Two-Hop System Approved

Construction permits have been received by Idaho Power Co. for a two-hop microwave system that will transmit standard industrial television signals from its Oxbow hydroelectric development to the remote control point at Brownlee. Operation is in the 6,500-mc band and the system will parallel an existing message circuit system operating in the same band, thus making it possible to utilize existing reflectors and even antenna systems, and also take advantage of an existing path of proved reliable operation. The application was accepted by the FCC on a case basis only and required considerable time and explanation before it was accepted.

The only other similar operation in the West is that of Southern California Edison, between two of its power plants. It was installed last year, incidentally without licensing problems, thus indicating a definite tightening in the commission's policies.

► **New edition of volume V of FCC Regulations** can now be secured for $2.50 from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Every licensee in the Power Radio Service must maintain at least one up-to-date copy of Part 11 which is included, among others, in the volume. The first subscription has now expired and a subscription to the new edition must be made.

NUCLEAR NEWS

Spent-Fuel Processing

The AEC has signed its first contract for the processing of irradiated reactor fuel returned from a licensed firm.

The fuel elements were used in the original core of General Electric's Vallecitos boiling water reactor near Pleasanton, Calif. They were highly enriched uranium-235 and, even after use in the reactor, contain enough unburned fissionable material to make chemical recovery worthwhile.

The AEC may not process the used fuel elements immediately, but will make financial settlement with the company. In the absence of commercial services to reprocess irradiated reactor fuels, the AEC had previously announced its intention to accept such fuels until July 1, 1967, making payments that provide for the chemical processing services.

New Superconductor Developed

A new superconductor material, which offers no resistance to appreciable quantities of electrical current, has been developed by Atomics International, a division of North American Aviation Inc., under a research contract with the AEC.

A wire that can be easily coiled has been drawn from the new superconductor. At liquid helium temperatures (—452 F) the wire has conducted 100,000 amp of electrical current per square centimeter in a moderately high magnetic field. The performance of this wire may be roughly equated with operation of a household electrical appliance at about 100,000 w from a normal size (110 v) wall outlet.

Plant for Wisconsin

The AEC announced that substantial agreements as to contractural arrangements for a nuclear power plant have been reached with the Dairyland Power Cooperative of La Crosse, Wis., and the Allis-Chalmers Mfg. Co.

The plant is essentially the one planned for construction in Los Angeles County in cooperation with the cities of Los Angeles and Pasadena, and Allis-Chalmers.

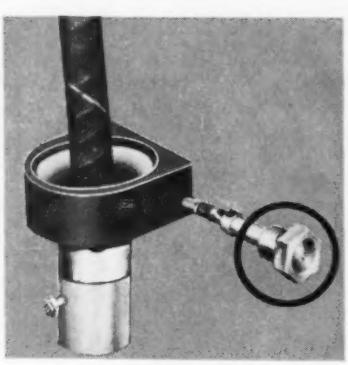
The two cities withdrew their proposal in February 1961, because of an increase in the estimated cost of power from the plant.

New Westinghouse Pad-Mounted Transformer for Underground Distribution Systems

Lack of standardization has hampered the development of residential underground distribution—made such systems difficult and expensive to install. For example, Westinghouse has designed more than 300 different variations of pad-mounted transformers—which is costly both to the user and the manufacturer. After several years' study of customer needs, Westinghouse announces the PSP—a complete transforming-

Westinghouse Primary Service Pad-Mounted Transformer, with optional provision for customer service meters. Main cover can be opened only from inside. Transformer compartment is located directly behind HV and LV terminal compartments. Accommodates 10 through 50 kva transformers interchangeably with same compartments. Detachable cover assembly interlocks with terminal and transformer compartments for maximum security and safety.

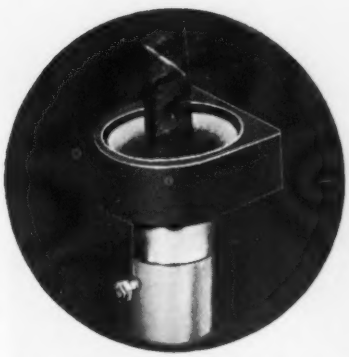
HV load break air switch—a Westinghouse exclusive—isolates transformer. Switch has visible disconnect blade (shown in open position), will safely interrupt 400-amp load current. Interrupter switch and disconnect are mechanically interlocked.



Built-in fault detector is an exclusive optional feature. Magnetic pickup type indicator shows location of fault when cabinet is closed. Note indicator button at base of cabinet in main view above.

J-70869

switching-protecting package specifically designed for underground service. The PSP is a Primary Service Pad-Mounted Transformer for residential underground distribution systems—single phase, loop or dual feed, 10 kva to 167 kva with primary voltages up to 15 kv. It is a completely standardized unit, with optional features engineered to meet any special requirements or variations in local practices. Ask your Westinghouse sales representative to show you how the new PSP transformer can simplify your next underground job—from the planning stage to the finished installation. You can be sure . . . if it's Westinghouse.



Exclusive Westinghouse design includes factory-built stress cones, providing convenient termination for shielded cables instead of old-fashioned, laborious hand wrapping.

LV terminal compartment at right encloses optional CSP breaker handle and terminal block for customer service leads. Four-hole spade terminals provide for multi-circuit connections. HV and LV compartments are separated by barrier. LV door can be padlocked. Inside catch releases HV door.

Westinghouse

For phone number of closest representative see advertising index in back of book.

ASSOCIATION AFFAIRS

NEMA Holds Its First Western Conference in Los Angeles

Staff members of the National Electrical Manufacturers Assn. from that organization's New York headquarters met with Western electrical manufacturers at the Los Angeles Biltmore Hotel during June. It was the first time that a full-scale meeting of the association had been tried on the West Coast. The purpose: to effect a closer liaison between the natural center of the electrical manufacturing industry in the East and the growing number of Western establishments.

A. D. R. Fraser, president of the Rome Cable Division, Aluminum Co. of America, and current president of NEMA, highlighted the potential growth of the electrical manufacturing industry by stating it will reach an estimated $50 billion annually by 1970—nearly 2½ times its present volume—and that explosive Western growth will account for more than a fair share of this potential growth.

Other industry leaders discussed such specific problems as employee relations, the trend in research and development in electrical manufacturing and the economic issues of foreign trade.

Realistic discussions of the antitrust laws and their implications to trade associations by Samuel W. Murphy Jr. of the NEMA counsel staff and a panel discussion of electrical codes and standards-Western style, moderated by Dan Miller, vice president, Western Division of the Square D Co., hinted at the practical values which could come out of similar meetings in the future.

NEMA's first Western conference was co-chairmanned by Raymond M. Waggoner, vice president, West Coast, Hubbard & Co., and A. Arval Morris, president, Electra Motors Inc.

► **For the first time since 1943,** Salt Lake City will be host to a general meeting of the **American Institute of Electrical Engineers** Aug. 23-25. On those dates AIEE will hold its Pacific General Meeting in the Hotel Utah and will feature a technical program of 27 sessions and symposiums selected to match the diversity of industry in Utah where a wide variety of space age manufacturing facilities are producing products ranging from electronics to solid fuel rocket propellants. An attendance of 800 is expected.

► The 1961 **National Power conference** (Joint ASME/AIEE) will be held at the St. Francis Hotel in San Francisco, Sept. 25-27. Arrangements are being made by L. A. Kilgore, West Coast representative for AIEE, and F. G. Feely Jr. of the ASME Power Division and his San Francisco representative, V. F. Estcourt. Sessions will include technical papers; inspection trips to PG and E's Pittsburg and Geysers plants, the San Francisco Bay Area salt water conversion research center, and other nearby installations. Guest speakers will include W. H. Byrne, ASME president; W. H. Chase, AIEE president, luncheon speaker; and the Hon. Fred Seaton, former Interior secretary, who will address the Tuesday evening reception and banquet.

G. W. "Cy" Sward, executive director, EERA, with C. W. "Brodie" Leihy, publisher of Electrical West. The EERA (Electrical Equipment Representatives Assn.) met in San Francisco June 27-29 to discuss mutual problems encountered in the distribution of electrical equipment and in the conduct of an agency business. Association members did an admirable job, taking on most of the speaking assignments. Warren Shew, publisher, Electrical World, covered the national business scene and Leihy challenged the association with his ideas of "Selling Today and Tomorrow"

Westinghouse Vice President Chris J. Witting, keynote speaker at NEMA's first West Coast conference, told Western electrical manufacturers to stay away from the panic button and buckle down to lick the great challenges of modern business life—challenges that only hint of the tremendous opportunities that await their successful solutions. Sessions were held at the Los Angeles Biltmore

Is yesterday soon enough?

Chances are Alcoa worked *yesterday* on precisely what you will need *tomorrow*.

Alcoa has been working on aluminum overhead conductor problems—and successfully solving them—longer than anyone else in the business.

Take a look at the record. Alcoa supplied conductor for the first all-aluminum conductor installation in 1899—it is still in service. The first Alcoa® ACSR was shipped in July of 1909. Even EHV is history—Alcoa developed ACSR for handling 220 kv way back in 1913.

Since those early pioneering days, we've had a hand in almost every major transmission line development. For example, Alcoa's 2.32-inch ACSR: you'll find it on two experimental 460-kv lines energized in 1960.

What has this to do with you? Consider. Out of this experience has come the industry's largest corps of field advisors —ready to work for you today. A complete line of accessories and conductors—the only single source available to you today. A guarantee of 62% minimum conductivity—at no extra cost to you today. The most extensive technical data on aluminum—available to you today.

And what of tomorrow? Then—as now—Alcoa research will answer utilities' demand for new products and techniques in the same way: Is yesterday soon enough?

ALCOA
ROME CABLE
DIVISION

NWPPA Meets

Bernard Goldhammer, Bonneville Power Administration's power manager, recently told the Northwest Public Power Assn. at its engineering and operating conference that it is possible that an intertie to California will be necessary in order to successfully pursue the treaty with the Canadians for a joint development of the Columbia River.

Goldhammer also told the group that a digest of the proposed legislation to protect the prior rights of the Northwest to power from government plans on the Columbia River has been mailed to all Bonneville customers for their study and comments.

In another session NWPPA Executive Secretary Gus Norwood reported on the May meeting of the Rampart Economic Advisory Board of the Corps of Engineers.

He reported that the basic question to be answered before passing on the economic feasibility of this project would be the question of whether Alaska could absorb the 33 billion kwh/yr to be produced. This generation would almost equal the total generation of the 17 federal projects presently operating in the Columbia Basin.

The standards engineer of city of Tacoma, Department of Public Utilities, Light Division, Allen O. Daniels, in speaking of the advantages of standards, said, "Investment requirements, load demands, revenue, net profit and other factors can vary greatly from year to year. We need to know our true unit costs of investment and unit costs of operation and maintenance expense. We can then use standards and planning to better utilize plant equipment and manpower."

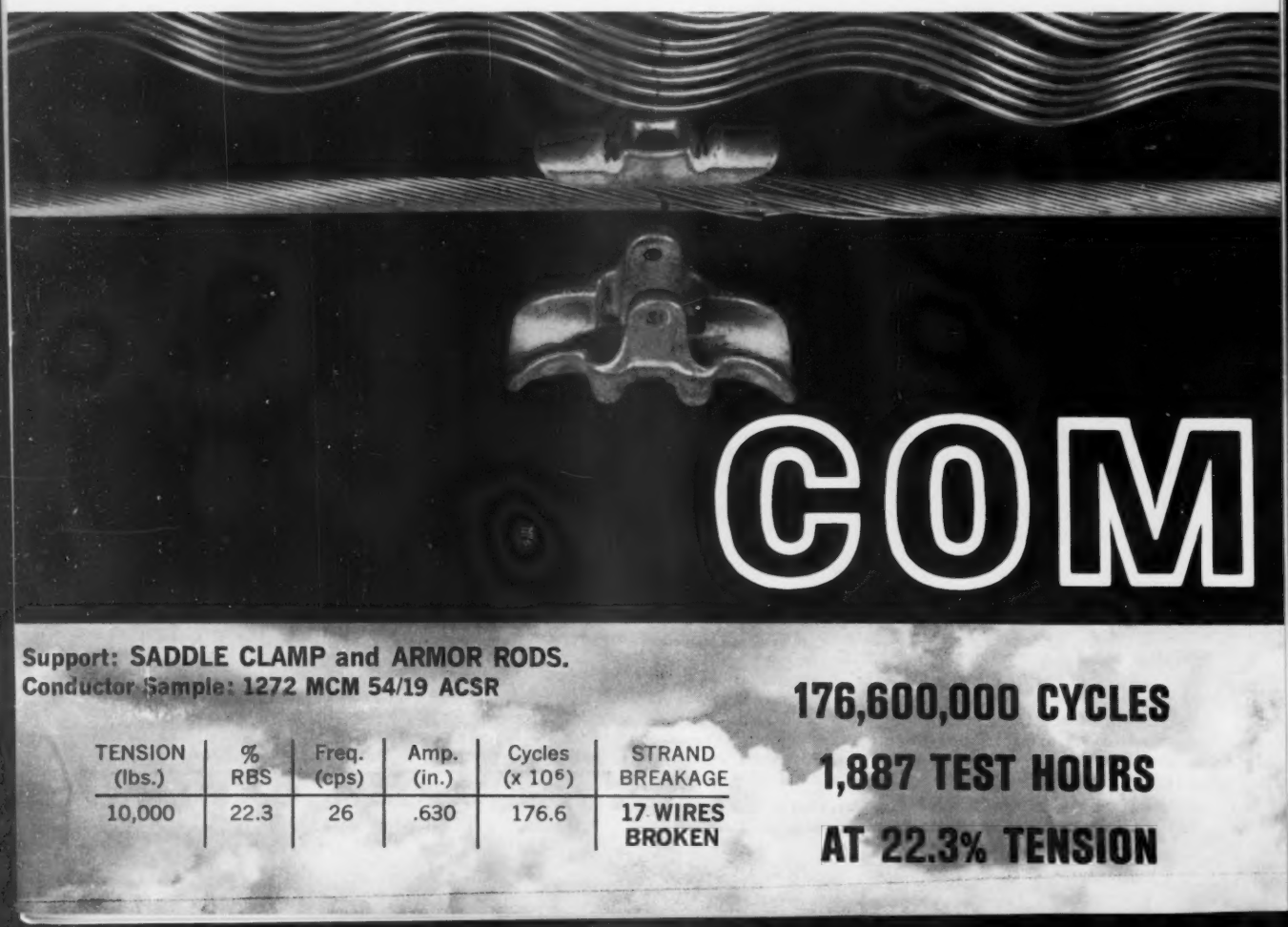
Harold S. Kern, supervisor of transportation, PUD No. 1 of Clark County, told the group of the tremendous progress that has been made in the past decade with motorized aerial lifts. He said that the utility people and enterprising manufacturers were quick to catch on to this new field of automation. Mounting labor costs and ever-demanding customers were spurs for this program, Kern said.

EASA Convention

How does an independent service shop survive (and even prosper) in an era of bigness? Basically that was the reason for and the main subject of discourse, in one form or another, at the 28th annual convention of Electrical Apparatus Service Assn., held for the first time in San Francisco, at the Jack Tar Hotel, June 11-14, 1961. It was attended by some 730 independent electric motor and equipment service shop owners and their wives from all parts of the U.S.

Twin aspects of this survival theme predominated. On the surface was the exploration of means and materials, tools and techniques to compete more efficiently and hence with a chance of profit. Underlying was the feud with the "captive" service shops of General Electric and Westinghouse over the aggressive and alleged "under cost" competition from these giants.

But that the feeling against these manufacturers was not quite unanimous came to the surface in the business session Tuesday noon when


COM
Support: SADDLE CLAMP and ARMOR RODS.
Conductor Sample: 1272 MCM 54/19 ACSR
TENSION (lbs.) | % RBS | Freq. (cps) | Amp. (in.) | Cycles (x 10⁶) | STRAND BREAKAGE
10,000 | 22.3 | 26 | .630 | 176.6 | 17 WIRES BROKEN
176,600,000 CYCLES
1,887 TEST HOURS
AT 22.3% TENSION

a motion was made that would have softened the association's official policy. That policy, stated by William Wheeler, New York City, chairman of "Small Business Protective Committee," was that neither advertising in the official magazine, EASA News, nor exhibits at the exposition accompanying the convention, would be permitted these two manufacturers. After passionate debate the motion was tabled and so the policy of the board of governors still stands.

Under that policy the special committee has asked the Federal Trade Commission to investigate the advertising and the sales practices of the two large manufacturers in relation to service shops.

Speakers on the program were either service shop operators whose efficiency and equipment and management have enabled them to compete successfully or they were motor manufacturers who rely on such independent shops for service.

Fred H. Pillsbury, president, Century Electric Co., St. Louis, for example, was the keynote speaker. Commending EASA for its high standards of service and codes of service policy, he urged that EASA members study and learn about new motorized products, mechanical, electrical and electronic drives of all types, new rerated motors, new lubricants, new insulation materials and techniques, new baking processes, new designs and materials used in fabrication and new machinery for repair work. They must also look to other areas where their services are needed in the pump, compressor and electronic service fields.

In another session William J. Wagner, general sales manager of the Delco Products Division, General Motors, Dayton, illustrated the multiplicity of uses of electric motors in all phases of today's living. He gave the members a 12-point program for getting more of the motor repair and replacement business.

From William M. Terry Jr., general manager, electrical department, Industrial Equipment Division of Allis-Chalmers Mfg. Co., Milwaukee, came "A Manufacturer's View of the Service Shop as a Continuation of Its Customer Relations Program." He reiterated his company's long-time policy of dependence on the independent service shops for the maintenance of the company's products in the field. He urged that any difficulties or defects found by them in the products be told constructively to the company. He asked that EASA personnel maintain a constructive attitude in handling the ultimate consumer's service problems as well as the manufacturer's product reputation. He also cautioned that the manufacturers are not building their equipment to be serviced but to give constantly better performance. They should look upon these new improvements in manufacture as opportunities even if it eliminates small areas of their present business. It may develop areas of other services to them.

As to equipment for their service shops, Paul Potter, Potter & Rayfield, Atlanta, Ga., stressed the question of when to buy and when not to buy. With higher hourly wage rates, more efficient equipment should have top priority, he said. He described several pieces of improved equipment designed and originally

PARE
524,000,000 CYCLES
6,930 TEST HOURS
AT 33.3% TENSION
Support: ARMOR-GRIP Suspension.
Conductor Sample: 1272 MCM 54/19 ACSR
TENSION (lbs.) | % RBS | Freq. (cps) | Amp. (in.) | Cycles (x 10⁶) | STRAND BREAKAGE
15,000 | 33.3 | 21 | .810 | 524.0 | NONE BROKEN

built by service shops and put into manufacture by his firm for more general distribution. Such items that have been developed and put into economical manufacture should be given preference over the building of new, he said. "The cost of a minute in your shop today is very important," he declared, and later, "When does a machine become obsolete? The day when your competitor has a new and better one."

The motor shop speakers were led off by Walter G. Brush, Electric Motor Service Inc. of Birmingham, Ala., who with color slides showing his shop and its equipment, described equipment and production methods for shops doing large and medium size motors. He made the point that a service shop cannot do satisfactory repair of large apparatus unless it is equipped and has room to handle such equipment.

Specifically billed as the speaker on "Building a New Business in Competition With the Large Manufacturers" was John C. Reed, Reed Electric Co., Portland, Ore. His theme was that to compete against the big manufacturers one must know their policy, prices, service, quality, sales force, engineering facilities and customers. Then one must do better than they do in each of these fields and sell on the basis of more personal service, faster service and extra quality. Every employee must be kept as a part of a team, well informed as to why they get or lose jobs, kept up to date on engineering trends and improvements.

Fred McBroom of McBroom Electric Co., Indianapolis, operator of several shops, described the equipment and production methods in his shops for doing small motor business as well as large. He stressed the development of the total service concept to do everything that a customer might need. He advocated classification by skills required rather than by size of motors. He felt that only through total service independents could survive, knowing their customers better and making sure to have the tools equal to or better than those of the captive shops.

Growth of business in the hermetically sealed refrigeration field was discussed by T. R. Warriner Jr. of Warriner Hermetics, Fort Worth, Tex. Pioneering in an area where air conditioning business has been growing rapidly, he discussed the problems he had in setting up to do service work on hermetically sealed motors and compressors. The manufacturers often refused to supply parts, seeking to get all of this business sent back to the factory. By manufacturing of parts and by a study of the conditions to be found in such work, he showed how his business of doing trade work for others on the repair and reconditioning of hermetically sealed units has grown. What he said of the failure rate of these units was somewhat startling as he went on to declare that the public objects to having to throw away a compressor unit after only four to eight years of use. He offered to help train shop personnel and to supply parts.

Charles Doane of Larsen-Hogue Electric Co., Los Angeles, told of his own company's program of training the personnel to build a good customer relations team. Each and every employee is made aware of his responsibility to hold up good rela-

What's your line tension phi...so...hy?...LOOSE?..."CABLE"?..."CODE"?...or TIGHT?
ARMOR-GRIP
TRADEMARK
Suspension lets
TIGHTER TENSIONS SAFELY
opportunities to SUBSTANTIALLY
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SEE TEST DATA ON OTHER SIDE
Manufactured in accordance with, or for use under, one or more of the following U.S. Patent Numbers: 2,691,865; 2,722,393.

tions, to circulate in the industry and among industries to become acquainted with the customers, to build a reputation for integrity and for dependability as to delivery and performance.

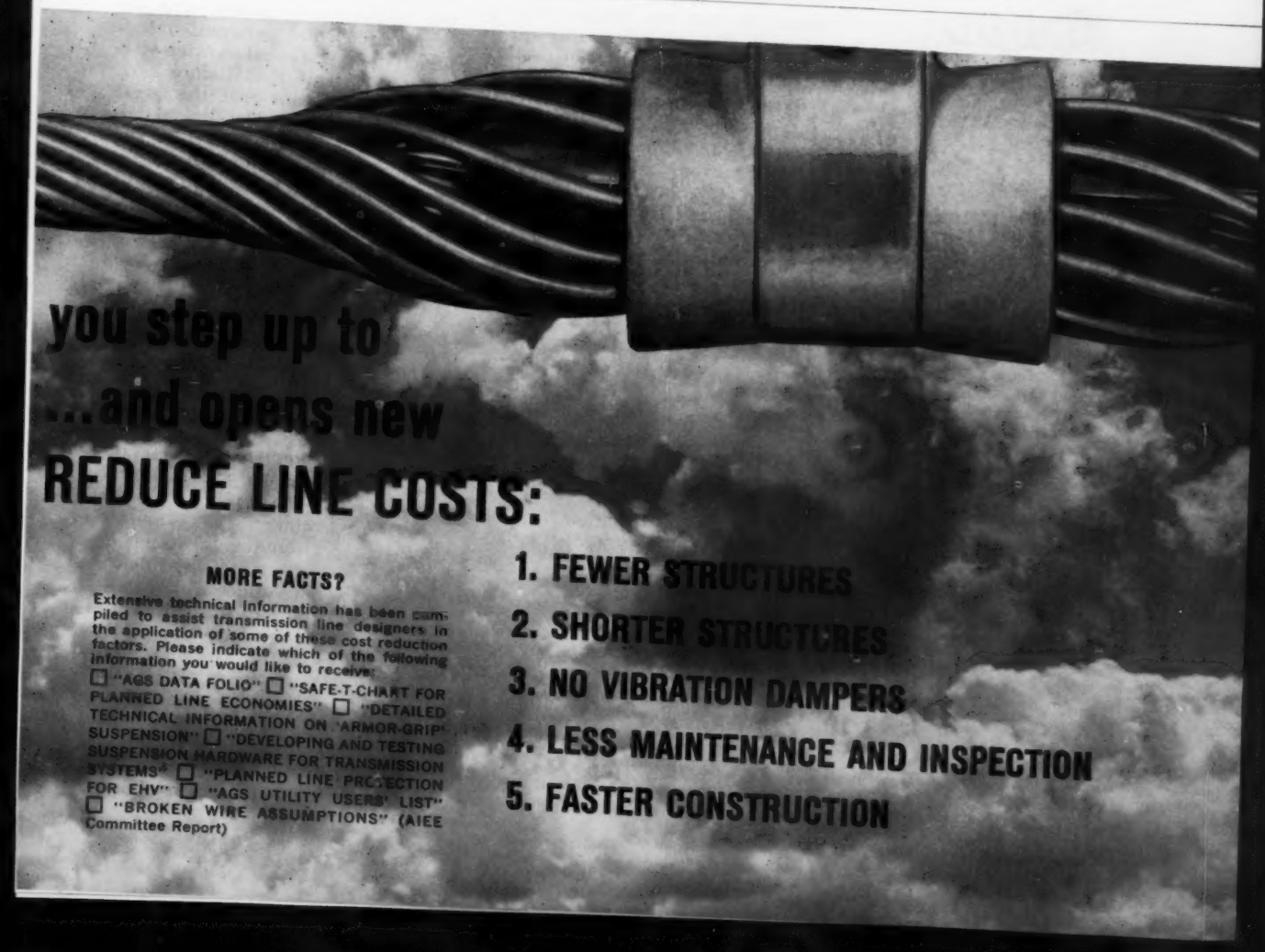
Discussing the office methods for a small business was Phil A. Reilly, district sales manager for a division of the Burroughs Corp. Office machines, he said, could perform no magic but they could do routine work much more accurately, speedily and simply.

To educate management in better management methods, the EASA management seminar was described by Stephen Vasquez, dean of the School of Commerce and Finance of St. Louis University, who has conducted seminars in many cities, including a recent one in Portland, Ore. Describing the objective as "to make managers make themselves better managers in a do-it-yourself type of program," which he characterized as somewhat like a weight-reducing program, Vasquez pointed out that management is a distinct skill that it is possible to learn. It is a skill that combines a scientific as well as an artistic aspect which he described in some detail.

Education and training in "Automation, Phase II—Maintenance and Repair," another course put on by EASA, was described by Ralph Vara, service department, Reliance Electric & Engineering Co., Cleveland, who has been conducting the course. Such training, he pointed out, would put the service shops in better position to play an important part in automated industry. In addition to the technicians and engineers, there is the practical problem of maintenance, replacement and repairs of such equipment. Motor shops, not originally in electronics, now find that today everything is using electronics and the public needs some sort of maintenance and service. This is a logical market for the service shops to develop if they prepare themselves for it. With a diminishing market in motor repairs since the institution of what he called "throw-away motors" that can be replaced cheaper than repaired, the independent service shops need such a market for their service.

The convention was presided over by J. Arthur Turner Jr. of Tampa Armature Works Inc., Tampa, Fla., terminating his term as president, and George Larsen of Larsen-Hogue Electric Co., Los Angeles, was installed as the president-elect. His partner, William Hogue, has previously been president of the organization when it was known as National Electric Service Assn. General chairman for the convention was John S. Van Alstyne, Van Alstyne & Son Electric of Sacramento, who handled a great proportion of the details of the arrangements himself. He was assisted by his wife as women's program chairman; Al Dutil, Enterprise Electric Works, San Francisco, transportation; Frank Silveria, Los Banos, hospitality; Alfred Kinney, Kinney Electric, Marysville, exhibits; William S. Bassett, Conrad Electric Co., Oakland, entertainment; and by Dick Gardiner, Electrical Specialty Co., Tom Stahlbaum, Tri-State Supply Corp., Al Ekdall, Insulation & Wires Inc., and Leo Alchimistri, Advance Carbon Co., San Francisco.

Marion Wassell, formerly of the St. Louis NISA staff, coordinated many activities on a local basis.


you step up to
...and opens new
REDUCE LINE COSTS:
1. FEWER STRUCTURES
2. SHORTER STRUCTURES
3. NO VIBRATION DAMPERS
4. LESS MAINTENANCE AND INSPECTION
5. FASTER CONSTRUCTION
MORE FACTS?
Extensive technical information has been compiled to assist transmission line designers in the application of some of these cost reduction factors. Please indicate which of the following information you would like to receive:
☐ "AGS DATA FOLIO" ☐ "SAFE-T-CHART FOR PLANNED LINE ECONOMIES" ☐ "DETAILED TECHNICAL INFORMATION ON 'ARMOR-GRIP' SUSPENSION" ☐ "DEVELOPING AND TESTING SUSPENSION HARDWARE FOR TRANSMISSION SYSTEMS" ☐ "PLANNED LINE PROTECTION FOR EHV" ☐ "AGS UTILITY USERS' LIST" ☐ "BROKEN WIRE ASSUMPTIONS" (AIEE Committee Report)

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GALVANIZED
STEEL STRAND

When in need of guy or messenger strand during an emergency, be sure to contact the nearest distributor of **Crapo** Galvanized Strand! Substantial stocks are maintained at strategic distributing points throughout the country ready for immediate delivery. Back of these stocks are our own extensive mill stocks of finished strand, and strand in process. If your jobber does not have all of your requirements, he knows he can depend upon us for immediate shipment of popular sizes and grades by air, truck or rail.

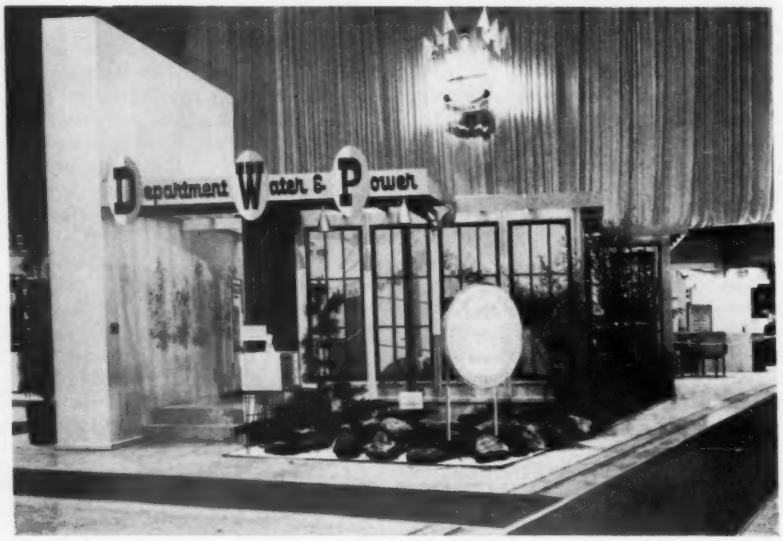
You, in turn, can rely upon **Crapo** Galvanized Steel Strand, at all times, to give you the utmost in performance at reasonable cost.

Crapo Galvanized Steel Strand is manufactured in all standard sizes and grades and in three weights of coating: Class A, B and C.

Phone the distributor of **Crapo** Galvanized Steel Strand near you the next time you need strand.

INDIANA
Steel & Wire Co., Inc.
Muncie, Indiana

MARKET DEVELOPMENT



Entrance of Los Angeles Department of Water & Power's "slice of Gold Medallion Living"

Model Home Draws

Almost 2,000 active prospects for new electrical installations were received by the Los Angeles Department of Water & Power through its Gold Medallion exhibits at the Los Angeles Home Show.

Of these prospects, approximately 15% have indicated plans for building Gold Medallion homes, 25% are planning Bronze Medallion homes, and the remainder anticipate home modernization. Total number of visitors to the three Gold Medallion projects in which the department participated has been estimated at more than 240,000.

"Appliances More Dependable"

Most household appliances are priced lower today than they were 10 years ago and are more dependable, requiring less service attention than ever before. This point was made by Richard E. Gould, chief engineer for G-M's Frigidaire Division, in a talk to home economists and newspaper people in San Francisco. The talk was in answer to the concern expressed over reliability and service of today's models.

The division's 1961 appliances are requiring about 9% less service attention than 1960 models and the 1960 line was 33% better in this respect than 1957 units, which required considerably less service than those of 10 years ago, he pointed out.

"Greatest improvement has been registered in automatic clothes washers and dishwashers where 1961 products are requiring approximately 60% less service attention than 1957 models," he said. "Yet even the electric refrigerator—a product that has been refined and perfected over a period of 45 years—has shown a service improvement of 47% since 1957.

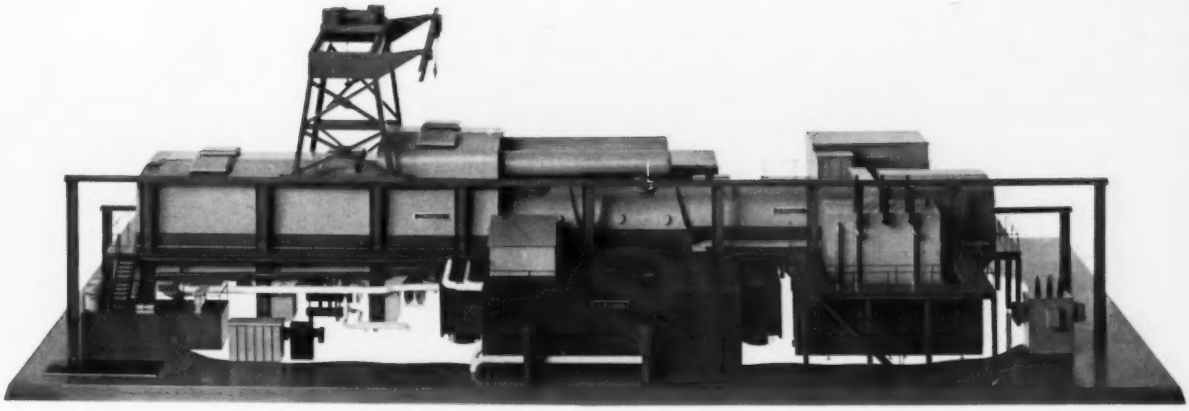
"It is significant that this great improvement in product dependability has been possible despite the numerous additional meaningful features which have been added to all appliances by customer demand."

New Models Shown

California Electric Supply Co. showed the 1962 line of Philco home laundry and radio, TV, Hi-Fi equipment at a showing in the Jack Tar Hotel June 26-27.

Features in the stereo line include equipment for receiving FM/multiplexing. An adapter will be available this summer and will be priced to sell under $50 retail, it was reported. An engineering development called "background music compensator" is claimed to increase fidelity of sound at low volume without losing clarity of tone.

New washer models have 12-lb, 7-sheet wash load capacities and carry price tags from $222.95 to $259.95. A suds saver is optional at $20. Philco-Bendix dryers, which are priced from $169.95 to $199.95 for the electric model, have automatic dewrinkling and the porthole door.



NOW—WESTINGHOUSE
POWER ISLAND
DESIGN PERMITS
REDUCED PLANT
INVESTMENT FOR
100 TO 500 MW
GENERATING UNITS

COMPACT POWER ISLAND COMPONENTS ARE KEY TO LOW FOUNDATION & INSTALLATION COSTS

The Power Island concept which Westinghouse helped pioneer in cooperation with Texas Electric Service Company offers an opportunity to make substantial savings on power plant costs wherever it can be applied. Power Islands contain turbine generator, heat transfer apparatus, switchgear, power transformer and associated control equipment—all engineered as a package. The result is an extremely compact assembly of apparatus arranged to minimize necessary piping and wiring, and to eliminate bus work. What is more, Westinghouse produces more "island" equipment than any other single manufacturer and is in the best position to integrate components to produce lowest cost.

SAVINGS ARE TANGIBLE

The Power Island can reduce plant investment by:

- Permitting completely above grade installation.
- Minimizing foundation requirements through use of tandem-compound turbine.
- Reducing piping, valving, conduit and wiring.
- Combining equipment such as main and auxiliary power transformers in a single tank.
- Elimination of low-voltage isolated phase bus.

Arrangement of the Westinghouse Power Island is ideally suited to outdoor installations with savings in building costs. Even where shelter is necessary, efficient layout will permit reduction in overall plant size and crane span.

POWER ISLAND DESIGN FLEXIBILITY ASSURES MOST EFFICIENT HEAT CYCLE

The Power Island concept assures integrated layout and design for both turbine and heat transfer apparatus. The heat cycle can be optimized within the framework of your operating specifications.

Next, the integrated Power Island design lends itself perfectly to full automation using the Westinghouse PRODAC*-IV digital control computer. PRODAC-IV can operate equipment directly during startup, operating and shutdown sequences—as well as perform computing, data logging, scanning and alarm functions to aid personnel in safe, reliable and efficient plant operations under all conditions.

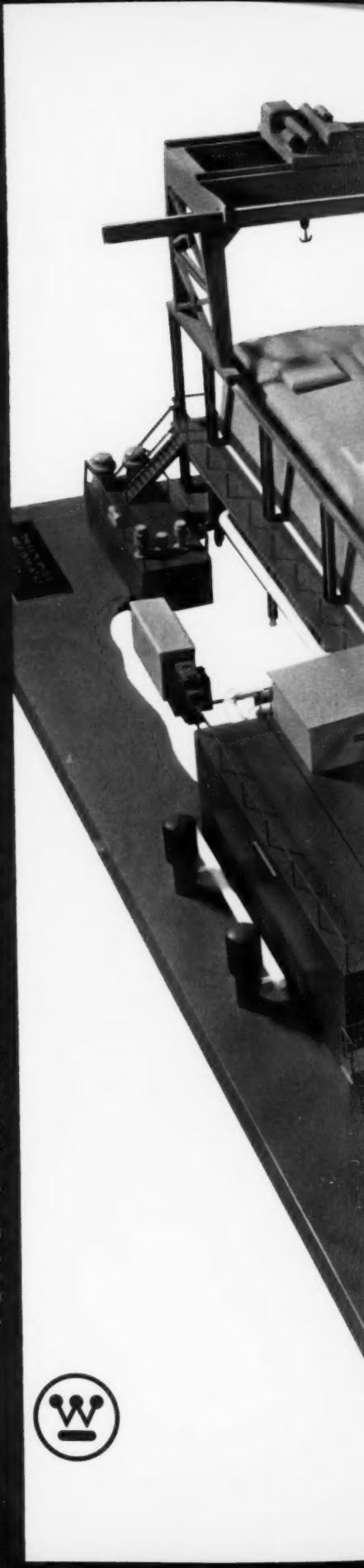
Finally, Westinghouse maintains steam division representatives in all major cities who will be glad to discuss the application of the Power Island design to generating facilities you have planned. These men are able to evaluate your information to make sure that any final proposal is complete.

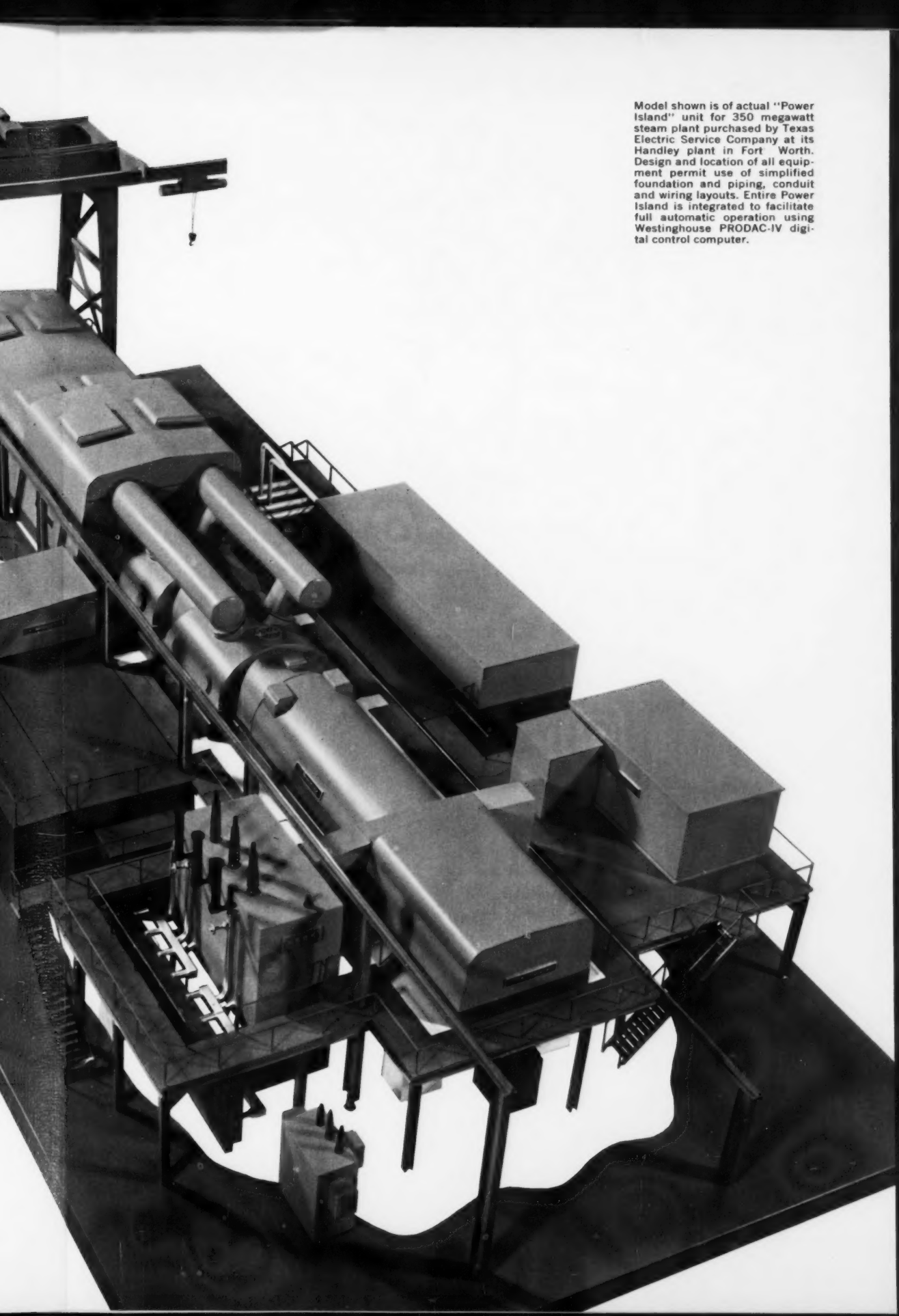
For further information on the Westinghouse Power Island design, contact your Westinghouse representative or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

*Trademark

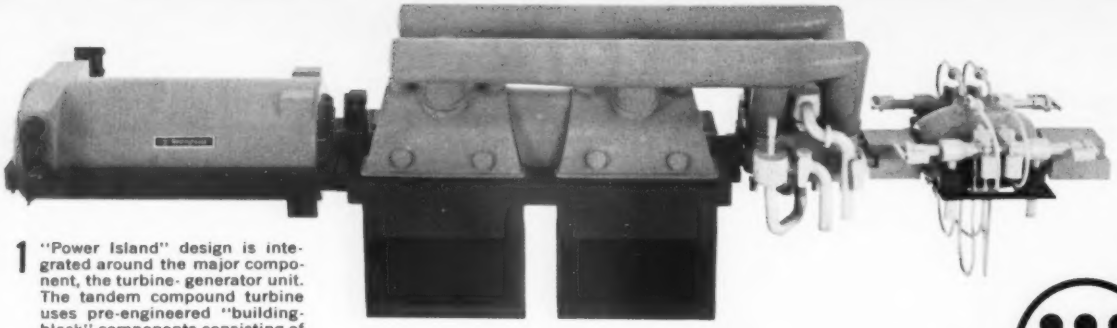
You can be sure . . . if it's

Westinghouse





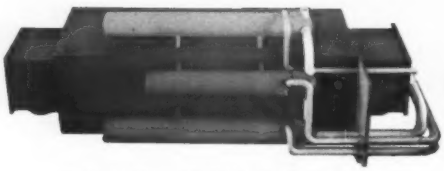
Model shown is of actual "Power Island" unit for 350 megawatt steam plant purchased by Texas Electric Service Company at its Handley plant in Fort Worth. Design and location of all equipment permit use of simplified foundation and piping, conduit and wiring layouts. Entire Power Island is integrated to facilitate full automatic operation using Westinghouse PRODAC-IV digital control computer.



1 "Power Island" design is integrated around the major component, the turbine-generator unit. The tandem compound turbine uses pre-engineered "building-block" components consisting of a high pressure element, intermediate pressure element and low pressure elements.

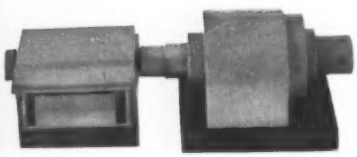
Westinghouse

2 Generator is hydrogen-cooled and THERMALASTIC insulated. Side mounted bushings permit close coupling of generator and power transformer to eliminate bus work and reduce over-all plant area.

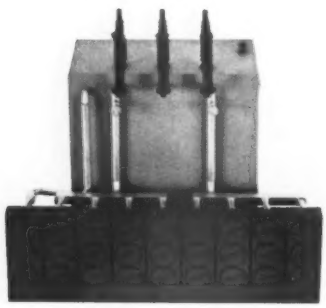


3 Use of two side inlet, single pass, radial flow, deaerating condensers allows low pedestal height with major reduction in foundation and piping. Completely welded, high pressure feedwater heaters with clad tube sheets are located to achieve further savings in space and piping.

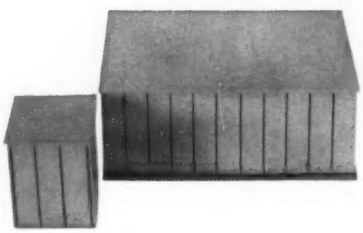
4 Flash evaporator with integral low-pressure feedwater heaters form a single structure below the turbine. Unit provides all make-up for system.



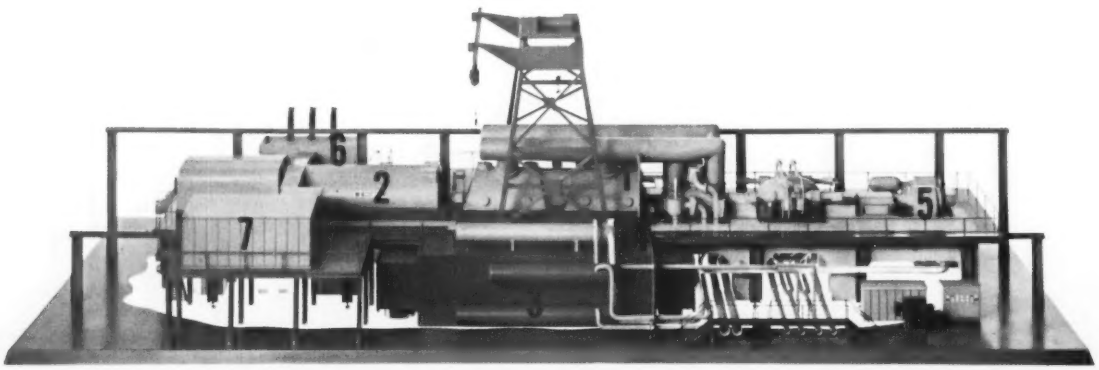
5 Main shaft-driven boiler feed pump simplifies plant layout, reduces condensate piping and enables unit to operate through low frequency and/or low voltage surge conditions.



6 Main transformer is close coupled to generator to minimize plant size and eliminate isolated phase bus. Auxiliary power transformer is included in same tank in isolated compartment.



7 Switchgear, located close to transformer, controls station auxiliaries. Shelterfor-M* enclosure provides weather protection. Outdoor power and motor control centers are strategically located to operate plant auxiliaries.



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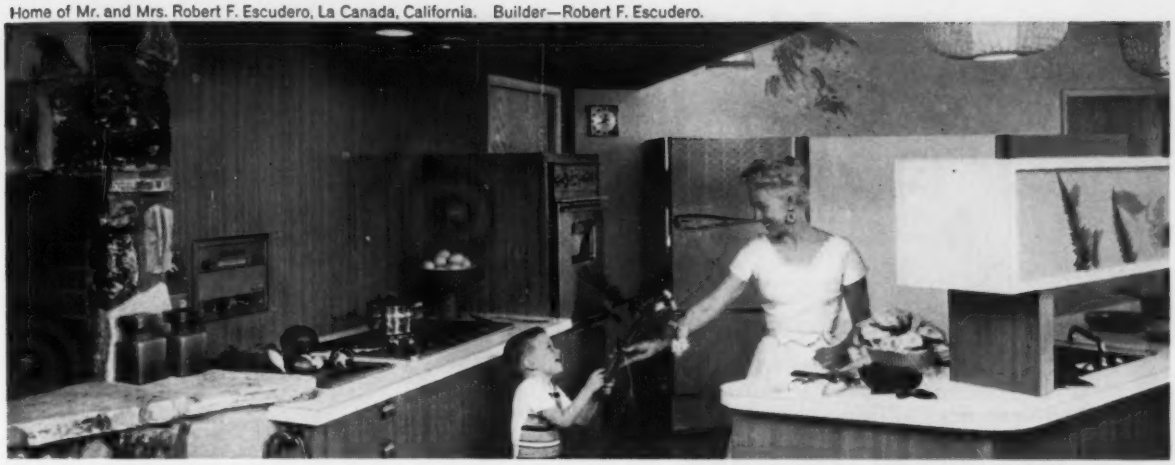
*Trademark

CP-1064

Home of Mr. and Mrs. Robert F. Escudero, La Canada, California. Builder—Robert F. Escudero.



WHEN THE FUTURE IS ALL-ELECTRIC

WHY BUY ANYTHING BUT A ***TOTAL-ELECTRIC GOLD MEDALLION HOME?***

"My husband builds total-electric homes because they're so modern—so efficient, they almost run themselves," says Mrs. Robert F. Escudero. "Naturally, when he built *our* new home, he made it all-electric. It's astonishing how much easier it makes housekeeping! I have more time for my family—important when you have a small son and a new baby."

Count the things that change for the better:

1. Flameless electric heat. "The electric heat pump warms our house in winter and cools it in summer—automatically. We set the temperature we want, and it heats the *whole* house *evenly*—quietly and *cleanly*."

2. A flameless electric range. "I love electric cooking, it's so fast—so clean—and doesn't heat up the kitchen. Pans stay cleaner with no flame."

3. A flameless electric oven. "Our flameless electric oven does wonders for meats—keeps the juices in—the meat tender. And we love to use our rotisserie," says Mrs. Escudero.

4. A flameless electric dryer. "The baby's things come out so sweet-smelling and soft," enthuses Mrs. Escudero. Flameless electric drying is odorless—prevents baked-in wrinkles.

5. A flameless electric water heater. Being flameless, electric water heaters can be placed in a closet, or a cabinet, anywhere—to bring you instant hot water.

WHAT IS THE GOLD MEDALLION HOME AWARD?

It is an award given only to total-electric homes. When a new home meets Gold Medallion Home requirements you know it offers: *clean, flameless, electric space and water heating; a clean, flameless, electric kitchen,* equipped with major appliances; plenty of *"Housepower"*—modern wiring to handle today's and tomorrow's appliances; *abundant lighting,* planned for comfort, convenience and beauty.

It costs so little to live better electrically. Why not move up to a total-electric Gold Medallion Home?

SOUTHERN CALIFORNIA Edison COMPANY

ELECTRICAL WEST
VOL. 127, NO. 2 AUGUST 1961

HOW APS VIEWS FREE ENTERPRISE

WALT LUCKING — or for that matter darn near everybody at APS — can tell you that a workable free enterprise system requires three things.

First — opportunity. This is the goal, the reward, or the carrot that motivates individuals. APS feels that its job is to create opportunity. For prospective industrial customers, this has led the company to spearhead a revision of state taxes, long term community planning projects, efforts to upgrade hospital service, vigorous support of bond issues, and active development of what is today a national example of good state and local government.

For APS employees, opportunity is the chance to advance—on merit, not seniority—and to produce abundantly in each job. Within our industry the utility is becoming interconnected on the basis of operating economies. It is offering isolated systems in its service area dollar incentives to become a part of the APS system. This is the case at Tombstone.

Second is freedom. APS feels that creating the system that offers the maximum freedom is its responsibility too. Creating freedom is the core of Arizona's organization philosophy. There is no staff. There are no dotted lines to obscure or vitiate performance. Each person has full responsibility and authority to perform in a job. This is full freedom—to excel or to fail—and to have one, you must have both. More than one supervisor has been jolted with, "I'll work on the problem with you all night—but I won't make your decision."

Freedom externally means "keeping in touch." Most of this takes place unofficially by employees who know of their company's dedication to growing with Arizona and proudly take part. This spirit (APS people call it "heart") makes APS a self-starting part of every constructive effort in the state. Says President Lucking, "I'm amazed at how effective our people are all over the state. Our only caution is don't stretch the truth—be honest even if it makes you blush. It's nice not to have to worry about corporate image as something separate and distinct from what we really are."

Finally, enterprise. "If we've created the goals and opportunities—and the freedom to seek these goals—then the natural desire of people to produce comes into play. It's our conviction that everyone wants to do a good job. The enterprise is in people. We don't do anymore than create a climate.

"You can't train an executive because you can't create enterprise. You create the climate of opportunity and freedom—and the persons with enterprise train themselves. This is our approach—get the climate right."

Walt Lucking looked almost embarrassed. "Sounds awful simple—even kind of corny--but we believe it."

This is the kind of corn that we commend to our readers in our second Portrait of a Power Company.

TOMBSTONE'S MAYOR, Walter Foster (left), discusses the company's proposal with Walter Lucking and Clayton Smith, editor of Tombstone's famous newspaper, The Epitaph. Gene Carr, APS manager for the area (right), completes the foursome

BEGINNING TO PROGRESS with the territory, an Indian squaw makes her first move to electrical living

ARIZONA PUBLIC SERVICE

How it creates the growth climate —for Arizona —for its employees —for the utility industry

TOMBSTONE, ARIZONA, where the Earp Brothers and "Doc" Holliday outdrew the Clantons and McLowry boys by the OK Corral, has under consideration a business proposition set before it by the Arizona Public Service Company. If Tombstone accepts this proposition, APS will purchase the municipally operated electric and gas systems for $315,000. This money will be sufficient to completely retire the city's bonded indebtedness, place its water system in first class condition—and leave a surplus of nearly $200,000. Tombstone would be the most solvent city in Arizona.

The haggling in the council chambers might remind an old timer of the famous trial of the Earps following the gun play at the OK Corral. As of yore, the *Tombstone Epitaph* dispassionately reports the news, and recommends—"get the facts, then decide."

Whatever the outcome in Tombstone, the opportunity that APS has offered the city is typical of the climate it is striving to create in its service territory.

Commenting on the Tombstone offer, APS President Walt Lucking says, "This is not an ideological struggle between the forces of good and evil. Our proposal is good only if it brings benefits to the people of Tombstone. Our challenge is to make sure that the benefits are there and the townspeople understand them when they make their decision."

Tombstone will not be the first area where the townspeople have had an opportunity to decide on the benefits of service from the company. Three years ago the members of the Verde Electric Co-op decided to go out of the power business and sold their system.

But growth by acquisition of isolated properties has been a small part of the growth that has been enjoyed by Arizona Public Service. Arizona, as a state, is growing at two and a half times the nation's rate. Its industrial growth is twice the rate of Florida—and APS has been the fastest growing utility in the country. These superlatives are impressive. The accompanying tables make clear the magnitude of the state's growth, but the exciting story is *what made it grow.*

A Special Report by the Editors of ELECTRICAL WEST

THE CLIMATE FOR ARIZONA'S GROWTH

ARIZONA PUBLIC SERVICE CO. has been complimented more than once by the statement, "There is a company that does more to create a growth climate for Arizona than any other business in the state."

Arizona newcomers are soon aware of the many ways that the activities and the people of the state's largest utility affect the well-being of every citizen. APSCO's folksy board chairman, John Jacobs, sums up his company's attitude with the statement—"If it's good for Arizona and our customers, it's good for the company, its employees and its stockholders. We'll back every program that meets these two criteria to the hilt."

That's why an observer will find Arizona Public Service people deeply enmeshed in every kind of civic development program whether it be spark-plugging a long-range planning project such as "Planning for Progress," or working with citizens' committees to insure passage of a sewer bond issue.

The turning point in the affairs of this dynamic company came in 1952. At that time the revolutionary economic changes resulting from World War II began to be felt in the Southwestern area. An unusually perceptive board of directors of the then Central Arizona Light & Power Co. recognized that Arizona's slogan "The Land Where Time Stands Still" no longer could be applied to a state which needed industrial expansion to support its growing population. It also recognized that achievement of industrial growth could best be attained through the help of a vigorous, dynamic electric utility system that could provide coordinated leadership over a major area of the state. A merger of the Arizona Edison Co. Inc., serving the southern part of Arizona, with Central Arizona Light & Power Co. and Northern Arizona Light & Power Co. created the present Arizona Public Service Co. Today that company serves 206 communities in 10 of the state's 14 counties. It is truly an Arizona utility.

At the time of the merger the company's management embarked on a long-range planning program calculated to build both the state's future and the company's role in bringing it about.

Orienting the company to serve Arizona began at the top. Its board of directors is composed of 22 business, civic and professional leaders throughout the State of Arizona (except for one lady board member from Colorado)—each representing a segment of the state's economy. These men are dedicated to the growth and prosperity of their state.

MEETING OF THE BOARD

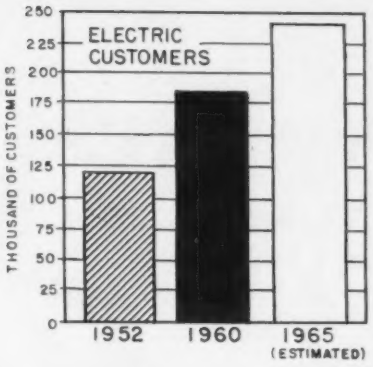
In shirt sleeves and slacks men of diverse business backgrounds (the board's lady member was absent) of all ages, from all walks of life, from all corners of Arizona, began the meeting by a very adroit needling of Board Chairman "Doctor" John Jacobs. The honorary Doctor of Law degree had been granted recently by Jacobs' alma mater. One of the board members solemnly offered to retain Doctor Jacobs if he thought he could get a parking ticket fixed. Doctor Jacobs grandly announced that he'd do his best—upon the deposit of suitable fees.

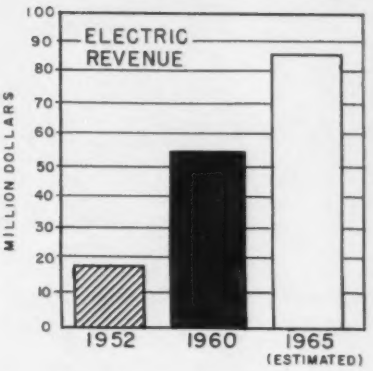
Then the horseplay stopped. Chairman Jacobs takes his responsibilities as board chairman seriously. He pointedly says, "These guys aren't necessary unless they are informed and contributing." Thus, in accordance with their special knowledge, Chairman Jacobs has his board deployed into six committees. Each committee includes a responsible company officer in the area under consideration, i.e., sales, employee relations, etc. "This way we're certain that for each policy decision we can look to a group of board members that

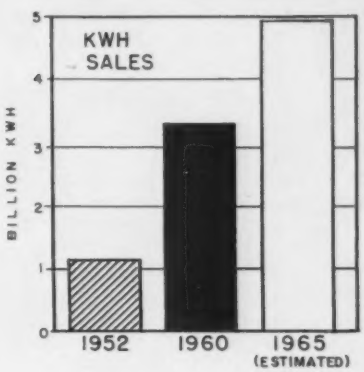
(Continued on page 44)

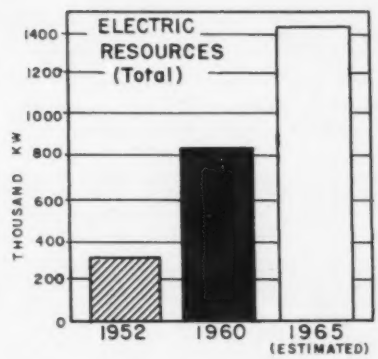
FRANK SNELL WALTER LUCKING JOHN JACOBS

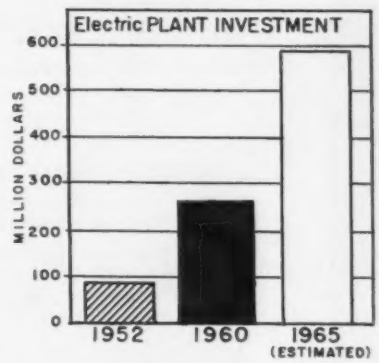
These three men are the starting place for the executive direction of APS. Frank Snell is chairman of the executive committee. Suave, personable Frank, a capable attorney, is a member of the Phoenix law firm of Snell & Wilmer. Walter Lucking is president. Engineer Lucking brings a warm gregarious atmosphere to APS. Chairman of the Board John Jacobs' successes have been in the field of farm management. He is, by definition, "everybody's favorite Uncle John." Totally unlike by profession, personality and experience, these men are perfect management supplements. **The differences are the key.** Each of these men is powerful, persuasive and brilliant. Yet they are also personally and professionally dedicated to the others' views in the area of their special knowledge. This climate of fellowship born of respect starts the healthy climate inside the company. Frank Snell said it nicely, "Walt and John are half the fun of working at APS."

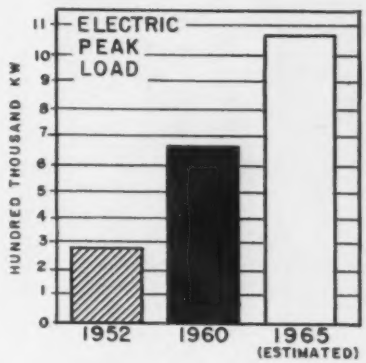












Growth is a common denominator in the electric utility industry. However the sustained growth shown here is rare indeed. With it, mistakes come home to roost in a hurry and the pay-off for farsighted management is tremendous

Gas Growth Estimates

	1952	1960	1965
CUSTOMERS, YEAR END			
GAS	103,355	196,801	285,064
REVENUE			
GAS	$7,221,233	$20,418,000	$35,569,600
THERM SALES	123,600,000	265,329,248	418,280,000
AVERAGE RESIDENTIAL USAGE—THERMS			
GAS	616	698	704

State-Wide Growth Record

	1956	1957	1958	1959	1960
RETAIL SALES	$1,335,046,000	$1,473,165,000	$1,573,723,000	$1,752,199,000	$1,884,723,000
INCOME OF INDIVIDUALS	1,854,000,000	2,010,000,000	2,202,000,000	2,388,000,000	2,613,000,000
MANUFACTURING OUTPUT *	450,000,000	510,000,000	550,000,000	650,000,000	700,000,000
ANNUAL PAY ROLL	171,600,000	195,500,000	212,500,000	250,000 000	... ...
BUILDING PERMITS (16 cities)	85,418,895	78,951,392	102,443,731	188,598,759	186,392,962
CONSTRUCTION INDUSTRY					
ANNUAL PAY ROLL	104,100,000	120,300,000	150,200,000	169,200,000	200,200,000
VALUE OF WORK	350,000,000	425,000,000	500,000,000	550,000,000	620,000,000

*Estimated Valley National Bank

ARIZONA CONTRASTS

Arizona, a land where time stands still—and also races into the future. Where the old West and the new West live side by side. And a place where nature blends mountains, deserts, colorful canyons and productive farm lands with a lavish hand

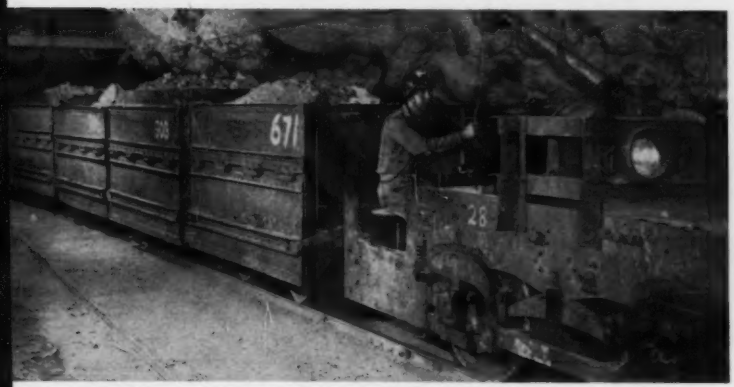
STATELY SAGUARO cactus, sentinel of the desert. Arizona deserts, made enjoyable by water and air conditioning, attract winter tourists

THE SLOPES of the 13,000-ft San Francisco Peaks behind Flagstaff provide full measure of winter pleasure. In Arizona, winter and summer are said to be "just a few miles apart"

A NAVAJO MOTHER carries on rug making in the tradition of her ancestors. Sharp contrast to the space-age industries in the area. Coal from the Navajo reservation will be used to fire the Four Corners plant

MODERN Phoenix creates a sharp break with the ghost towns and historic past. A city whose fantastic industrial growth has served to enhance rather than detract from the beauties of the area

ABUNDANT SUPPLY and intelligent use of water have converted thousands of acres of prairie to productive lands. Agricultural load is important

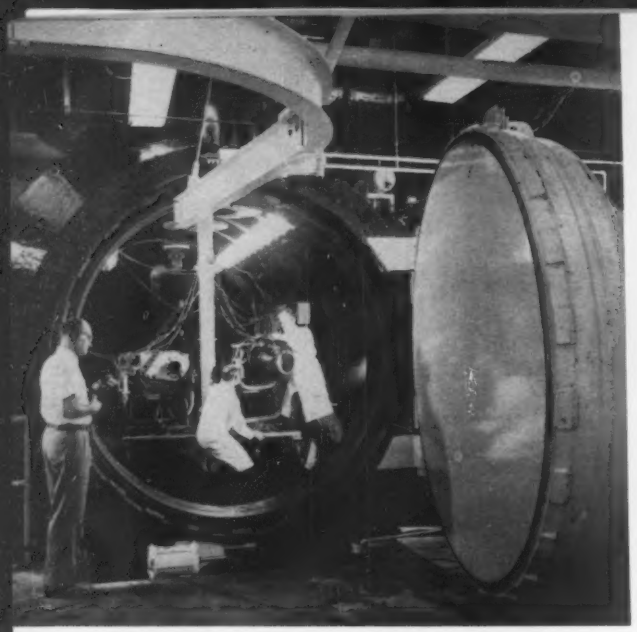


MINING, one of Arizona's oldest industries, continues to play an important role in the economy of the state. The addition of other industries has tended to diversify the economy of the state

COWBOYS still live in Arizona. Cattle raising continues to be an important part of the state's 400 plus million dollar agricultural product

FEW OUTSIDERS think of Arizona as a timber state, yet the timber stand of the Kaibab National Forest ranks with the nation's best

A PETRIFIED TREE on the desert tells the story of huge forests that grew many eons past



AIRESEARCH CO.'s giant altitude and low temperature test chamber is typical of the science-oriented industry that is being attracted to Arizona's progressive communities

(Continued from page 40)

is well informed, to offer suggestions."

Looking at it from the other side, the company's officers welcome the chance to swap ideas and talk about preliminary plans with a group of men thoroughly knowledgeable in the subjects under discussion.

The board meeting progressed in an orderly fashion, settling details regarding listing on the New York Exchange—an unfortunate personnel situation—a report on the Colorado River Storage proceedings in Washington. At each turn we saw the successful businessman's disdain for mere form, but piercing concern over substance. On the way out of the meeting Lucking smiled, "These guys really get to the heart of the matter don't they?"

Agreed!

In addition to an Arizona-oriented board, a determined effort was made to improve the business climate by establishing community betterment programs spark-plugged by APS managers in the field. Again the company's penchant for long-term planning came into play because each community was encouraged to take a forward look at its facilities and initiate a program of land use planning, zoning, traffic flow and similar functions that would provide orderly growth.

This farsighted planning revealed the pressing need for unheard of quantities of money to build the sewers and schools and highways and hospitals necessary for the growing community. Four years ago Phoenix citizens marched to the polls and passed a $70 million bond issue by a 4-1 margin. Within the last few months they have undertaken another $123 million bond obligation—and all of this has been done without an increase in tax rate. People of Phoenix speak casually about the need for $300 million in highways over the next 20 years. This prodigious spending is for a town of less than half a million people.

Along with the planning, the industrial development department initiated an intense assessment of state and local resources which might best be described as a master plan for the development of a diversified industrial economy best suited to the needs of the state. This plan embraced the necessary studies to promote the efficient and economical use of natural resources to modern refining and processing techniques, the support of research programs carried on by universities, government and private foundations. They work with all state, county and community officials to help them acquaint industrial prospects with the advantages of their areas. They provide a centralized reference library of facts, figures, maps, books and other pertinent data from which industrial reports and market surveys can be provided for specific industrial prospects.

Specific cases of company activities in the field of community development and area betterment are far too numerous to be recounted in toto. A few examples will suffice to indicate the scope and energy of APS efforts to promote the state. When the city of Phoenix did not have the facilities to produce it, the company drew up the first complete school district map for Maricopa County on which school district taxes are assessed. When the company heard that a survey team from a large industry was in another Western city investigating a possible plant site, the company plane was dispatched to bring them for a survey of Arizona communities with the result that another large new industry was brought to the Phoenix area. The company has even gone to the extent of preparing a special brochure outlining the cultural and living advantages of Arizona designed especially to attract high talent professional people to the area to fill its ever-growing need for technical specialists. These brochures are supplied to the growing complex of electronics and computer firms to aid in their recruitment programs.

PAYOFF IN RESULTS

The snowballing effect of this continuing and aggressive development program is now easy to measure quantitatively. A thousand families a month are migrating to Arizona, strangely enough nearly half of them are migrating eastward from the Pacific Coast states and a full quarter of them come from California. The industrial growth rate is two times that of Florida. The average income of Arizona residents has more than doubled in 10 years and nonagricultural employment has increased 116% in the same period. The state has led the nation in the past decade in the rate of employment growth, the rate of manufacturing employment growth and the growth of nonferrous mineral production. In this period, the Phoenix metropolitan area has developed a highly selective industrial complex of impressive dimensions. Reynolds Metals Co. operates the world's largest extrusion plant, employing 2,500 people; Goodyear Aircraft Corp., with a pay roll of approximately the same size, has a vast research center and airplane assembly plant in the area; Motorola Inc. has three plants in the area, including the world's largest producer of germanium power transistors. The Sperry Phoenix Co. has just completed a million-dollar addition to its production plant in Deer Valley and the General Electric Co. decided to headquarter its computer department in that same area together with its manufacturing facilities. AiResearch Mfg. Co., the largest manufacturing employer in Phoenix (with 3,600 employees) is noted for its design development, manufacturing and testing of aircraft and missile accessories.

At the same time that large industry has been settling in the Phoenix area other Arizona communities are beginning to enjoy industrial expansion. "Bab" Babcock, manager of area development, says, "We feel that when the Phoenix area reaches growth limits other communities will keep us soaring."

COMMUNITY LEADERS LOOK AT APS

LEW HAAS, ***Secretary***
Phoenix Chamber of Commerce

We called on Lew Haas, secretary of the Chamber of Commerce, to get the story on Arizona's industrial growth. This is his story: "At the end of the war it was apparent that Arizona had been undergoing an economic revolution as a result of the World War II activities. The success of defense industries in the area hinted that Arizona was well situated for the development of civilian production. Service personnel spread the word about Arizona's delightful climate and as a result people, young and old, began to move in as permanent residents. The new people, coupled with the inherent natural advantages, created the base for a strong economy.

"The needed ingredient was leadership to transform potentialities into realities. About that time, John Kimball and Henry Sargent (then with Central Arizona Light & Power Co.), Herbert Leggett of the Valley National Bank and a few others began to whoop and holler about getting industry into the state. As they wrestled with the problem it became apparent that, for anything more than hit-or-miss success, Arizona's business leaders would have to assume the task of raising the economic, social and cultural levels of the community and the state. No other organization in the state has contributed more — or more willingly — to the hundreds of separate projects that go into making a community a good place to work and a good place to live.

"One of the first steps was the establishment of a good tax climate. Our legislature, with the help and backing of Arizona businesses, abolished the manufacturers' inventory tax, eliminated the sales tax on goods in process and established a high depreciation rate (50% on machinery). These tax reforms benefit the entire community. We make no concessions to industry. We want to win them on our own merits.

"Another thing, these fellows are plenty choosy about the character of industry they want in Arizona. A beautiful state like ours can attract with ease all of the scientific, professional and skilled people that it takes to staff the industries that keep our communities lovely."

HERBERT LEGGETT, ***Vice President***
Valley National Bank

The most respected chronicler of Arizona's growth is the Valley National Bank's Vice President and Analyst Herbert Leggett. With a fine wit, Leggett makes an economic trend more fun than a pie eating contest.

"Public Service is a super-growth company in a super-growth economy. Historically, Arizonans have said their economy is based on the five Cs: copper, cattle, cotton, citrus and climate. In recent years we've added a wide variety of industry. All this, together with spectacular scenic attractions such as the Grand Canyon, the snow-capped San Francisco Peaks, the pine forests and hot deserts, has lured tourists, workers and retirees alike. The upshot of all of this is all to the good of Public Service Company. When you combine deep well pumping, a high rate of industrial growth, and air conditioning saturation up above 90%, you have the fundamental reasoning behind an annual growth pattern which is 12% per year or better. We see no slow up and some signs of increase."

JACK WILLIAMS, ***Radio Executive***
Former Mayor of Phoenix

Believing that good government is essential to constructive growth in Arizona, citizens of the state take pride in what has been described as "an oasis of political sanity." To get a look at the political scene we chatted with two-time mayor of Phoenix Jack Williams. "First of all you have to understand that I am not a politician, I'm a businessman. In Phoenix we have an unofficial nonpartisan group that call themselves the Charter Government Committee. The purpose of this group is to come up with an honest and capable slate and get them elected—then, because they don't have any political ambitions, they disband until the next election. Barry Goldwater was one of their selections. He didn't have any notion he'd ever be in politics either. But what kind of a person could refuse to accept the candidacy after he'd seen what good government means to a community?

"When I was mayor, I wouldn't have gotten a thing done if it hadn't been for the help of the business people that got me in there. I worked the devil out of your friends at Public Service Company —but we really got things done."

THE CLIMATE FOR UTILITY GROWTH

WHILE ALL THESE BROAD-GAGE PROGRAMS have been carried out, the company has not neglected its responsibilities to the electric utility industry and to its own growth and progress. In an area where water conservation, federal power and the U. S. Bureau of Reclamation play dominant roles in political thinking, the company not only has managed to preserve and expand the stature of an investor-owned utility but also has contributed mightily to the economic future of the state through its own operations. For example, the company has conducted extensive research into the development of coal resources of the area for the future production of electric energy. It has been instrumental in securing for Arizona adequate supplies of natural gas for its own and customer use. The management team has spearheaded the battle to preserve an equitable tax base for the state by joining with neighboring utilities in the development of an intermountain transmission grid that would not only provide the benefits of interconnection for the member companies but also the facilities for a furtherance of cooperative efforts between the company and the government in utilizing power from the federally built plants on the Colorado and other rivers of the region.

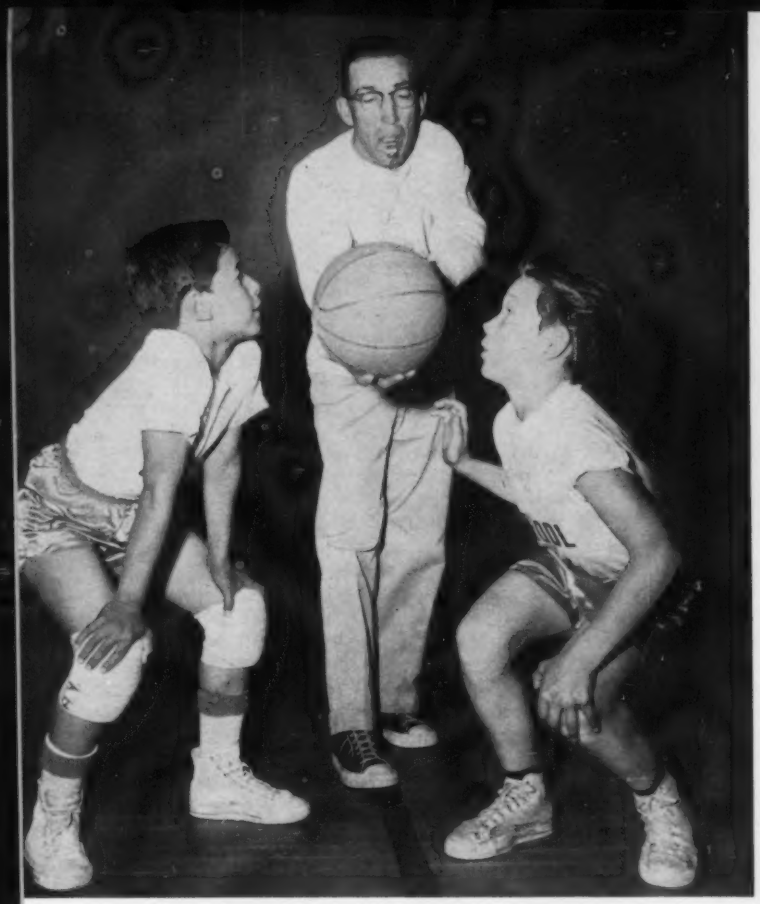
The company is greatly encouraged by the mutual economies that come from cooperative ventures with other utilities. "Now that we have the computer, we have the ability to explore the benefits of mutual operation. Once we have the engineering facts documented, it's pretty easy to reach agreement with our neighbors," says Hennen Forman, executive vice president in charge of planning resources and operations group.

Geographically the company is the focal point for interconnection with the power pools to the north, east and west. It has assumed its full share of the responsibility of power pool integration for the benefit of its customers. To the southwest it is a partner with California Electric Power in a unique venture that resulted in the construction of the Yuma-Axis power station, jointly owned by the two utilities and closing the transmission gap between southwestern Arizona and southeastern California.

Diametrically across the state in the area where Arizona, New Mexico, Colorado and Utah meet, the company recently began construction of its Four Corners steam plant on the Navajo Indian reservation, utilizing coal produced on the Navajo nation. Proceeds of the coal sales will immeasurably improve the economic status of the Navajo nation and the steam plant itself will provide a connecting link between the Arizona system and that of the New Mexico Public Service Co., which was a partner in the fuel resource development study. A heavy 230-kv intertie to the northern boundary of Arizona will interconnect Arizona Public Service with Utah Power & Light, which is a member of the Northwest Power Pool. Indicative of the farsighted and confident attitude of the company is the current construction program which will link the new Four Corners steam plant with the Phoenix area by means of the country's first large-scale 345-kv transmission line. This is only one small phase of the most intensive building program that the company has ever undertaken. The program is geared to keep well ahead of the steadily increasing customer needs of the state. A perspective of the future requirements can be obtained by viewing the growth in the past decade when kilowatt-hour consumption in the state increased more than 300%.

Utility plant investment has doubled on the average of every five years since 1945 and will more than double again through 1965. Capital requirements to meet the growth are expected to exceed $320 million in the next period ending in 1965.

***ONE OF THE STRENGTHS** of the Arizona organization is the high degree of freedom given to the division management. In the two pictures above, taken within seconds of one another, a group of division managers reflects varying reactions to a proposal by one of their own kind. The division manager's meeting was their own, without any general office direction. Division managers are encouraged to take on people up to the point where it would be more economic to share specialized skills in the general office*



A LINE CREW FOREMAN in Globe, Ariz., voluntarily contributes off-time hours to refereeing youth athletic activities in his home community

FUTURE CUSTOMERS

Throughout the length and breadth of Arizona, Public Service employees believe that what's good for their community is good for their company

THE "EXECUTIVE AIRCRAFT" flies a group of top level high school scientists to General Atomic's research facilities at La Jolla

SHOWING THAT THE JOY of Christmas is giving, Public Service employees turn out wholeheartedly with Christmas baskets for the needy

WHEN PUBLIC SERVICE CO. extended its transmission line to Tuba City, the whole town turned out for a celebration—particularly the happy bunch of Indian youngsters photographed during the festivities

TWO PROUD YOUNGSTERS demonstrate their prize-winning 4-H electrification program exhibit co-sponsored by APS and University of Arizona

THE CLIMATE FOR EMPLOYEE GROWTH

THE BASIC ORGANIZATION starting place for APS efficiency is the principle of the company to place decision making at the lowest possible level of supervision and to reduce the number of supervisory levels to an absolute minimum. The accompanying organization chart, unorthodox as it may be in the classical sense, indicates that company management has succeeded in limiting decision-making levels between the manager in the field and the president to three.

The executive management group of the company consists of seven officers reporting to the president. These officers concentrate on long-range objectives and across-the-board policy. They advise and assist the president in over-all leadership of the company. Each has one segment of the company's major functions under his direct control. Each function likewise is divided into appropriate segments, each with its own manager. The latter has full responsibility, authority and accountability for the operation of his command.

The basic point that differentiates APS from many other utilities is the assignment of authority, responsibility and accountability to these individual managers who are only one management level away from the president.

One of the seven executives is manager of division operations, whose department consists of all of the division managers and their employees. Division managers have an almost totalitarian control of the goings on in their divisions. They're encouraged to engage in as much construction work as they can within the framework of making economic use of people and machines. Keith Turley, the organization development specialist, says, "If these fellows don't know how to operate in their division, we are certainly in no position to second guess them."

Managers, other than division managers, have "service" functions. These jobs are differentiated from the operating jobs in that they are cross-the-company kind of jobs rather than tailor-made for a given division, as is the case with the operating management jobs. "Don't get fooled by this word services," Turley cautions. "In some companies, services is just another word for staff. In our company, each service manager has the line responsibility for carrying out his job, be it area development, budgeting or personnel services. If he gets at loggerheads with another services manager or division management, he's only two jumps from the president's office and that's where we think he ought to be."

President Walter Lucking, in addressing the National Industrial Conference Board, summed up his management philosophy stating, "A quick look at many organization charts discloses that we have piled level upon level of management. Some authorities tell us that the growth of levels is created by the failure to decentralize. I would suggest that such vertical growth has been created in part by the tendency to structure management position for the purpose of *doing* the work of subordinates rather than *managing* the work of others. Thus too many managers, particularly in the mid-echelon, become functional specialists. In such cases the goals of management by self-control and decision making at the lowest possible levels become nothing more than never-to-be-realized ideals."

Whatever the merits of APS organization may be, it is brilliantly successful in getting things done.

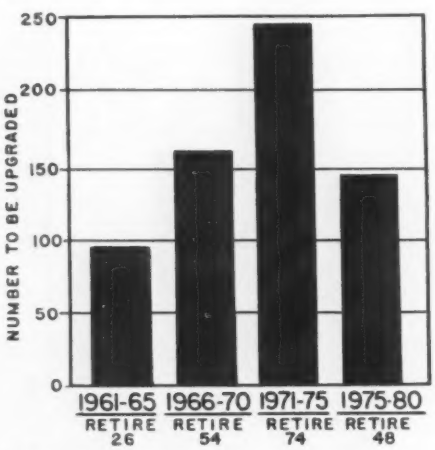
For example, the management services group, under Vice President Doug McGregor, embraces many functions pertaining to company personnel, not the least of which is that of employee development. Basically, his responsibility is the development and effective utilization of the company's manpower. Under his direction there has been developed an organizational climate that gives the individual the opportunity for personal growth and development in the highest tradition of the free enterprise system.

JOB BIDDING

Probably the mainspring of the employee development program is the job-bidding system instituted by the company. Under this system vacancies in any department are described in a job opportunity folder and sent to all employees. Any employee who finds a vacancy that appeals to him and which he thinks he can fulfill may enter a bid for that particular job. Application forms in triplicate are filled out, one going to the employee's present supervisor and two to the industrial relations department which forwards one to the supervisor who has the responsibility of filling the vacancy.

Through the use of the job-bidding system the employees of the company are continually made aware of new positions within the company and of their opportunity to try to progress by qualifying for higher positions. It is also indicative of the company's strong determination to promote from within wherever possible. By offering jobs to the best qualified, the stulti-

Chain Reaction Effect of Retirements



During 20 Years:
Retire 202 managers • Upgrade 650 personnel • Recruit, retain and develop 300 potential managers

The chart reveals the number of job changes and managerial additions that will be caused by retirements alone. The requirements from company growth, early death and leaving the company are not included

COMPUTER TEAM, above, grew out of a variety of lesser jobs (see table) using the company's job bidding system

Name (left to right)	*Present Job*	*Prior Job*
Kai-Henning Pedersen	Computer Technician	Electrician
Albin Rippstein	Senior Programmer	Accountant
John Anderson	Senior Computer Engineer	Junior Electrical Engineer
Maxine Darland	Senior Coder	Insurance Clerk
Albert Bates	Programmer	Assistant Editor Spark & Flame
Della McLoy	Coder	File Clerk
Bevan Jones	Computer Research Consultant	Commercial Industrial Salesman
Robert Fissel	Data Processing Supervisor	Accountant
Walter Levi	Computer Services Manager	Wage & Salary Supervisor
Robert Cable	Computer Operator	Meter Reader
David Rolan	Supervisor Computer Operations & Engineering	Radio Engineer

fied "civil service" atmosphere where seniority is all-important is replaced by a highly competitive spirit.

SELF-STARTING TRAINING

The system would not be practical unless employees were given the opportunity for self-improvement. This phase of the personal development work is encouraged in many ways, not the least of which is the Opportunity Schools which cover a variety of subjects pertaining to company operations. These schools, running from six to 12 weeks, are voluntary and generally consist of a two-hour class once a week.

Notices for these schools are posted on bulletin boards and descriptive literature and application forms are placed in company reading racks so that all employees are exposed to these opportunities. In the past five years 60 courses have been offered and over 350 employees per year have participated.

More sophisticated educational opportunities include college courses and correspondence courses, for which the company pays half the cost of tuition upon completion of the course. Other schools run by the company include a gas welding school, right-of-way education, an electronic training program and a course in radiation measurement.

The company likewise is making a determined effort to open up channels of communication not only to the supervisory personnel but to all employees. For example, its "Let's talk it over" program is given to all employees on company time. It is a 16-hour program that runs eight successive days (two hours per day), discussing such matters as state and local government affairs, politics, socialism, free enterprise and other facets of civil education.

All customer-contact people in the company are called together in groups of 20 for a customer relations training program that takes two full days. Foremen, likewise, are given a solid week of special training annually in a course taught by specialists from various departments of the company.

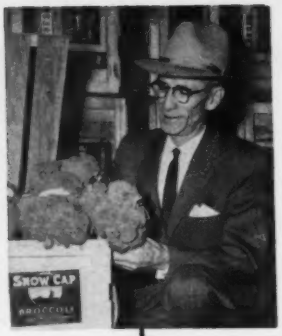
For management groups, the company holds semi-annual meetings at local resorts away from the job where groups of 20 managers and supervisors of all levels get together for problem-solving sessions, to hear reports from company officers and departments and to "brainstorm" challenging material presented by industry and business leaders.

A management forum of top level executives holds conferences patterned after the supervisory conferences away from headquarters.

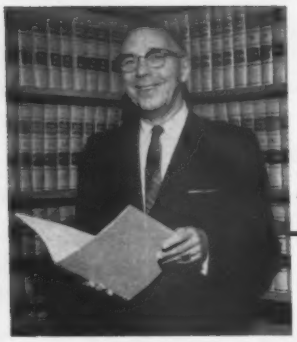
The company's apprentice training program is considered outstanding by the industry. Applicants for apprentice training are very carefully screened for background, education and emotional stability. It takes five years to complete the apprentice training program and be graduated as a full-fledged lineman. The care and thoroughness taken in this particular program is demonstrated by the fact that nearly half of the graduates of the apprentice school in the past five years are now in supervisory or management positions.

The company's heavy emphasis on the development of the individual is not entirely altruistic because a self-generating pool of executive talent within the company will be a vital necessity in its long-range planning program. During the next 20 years 55% of its present 400 managers will retire.

The chart shows chain reaction effects of management retirements when viewed from the long-range perspective. During the next 20 years, the retirement of 202 managers will require the upgrading of 650 people and the job of recruiting, retaining and developing 300 new potential managers. Thus, the company accent is on the growth of the individual as well as growth of itself and the community it serves.



JOHN M. JACOBS
Chairman of the Board



WALTER T. LUCKING
President

FRANK L. SNELL
Chairman of the Executive Committee

EXECUTIVE

PLANNING, RESOURCES AND OPERATIONS

A. H. FORMAN
Executive Vice President

MARKETING

DON WILLIS
Vice President

MEASUREMENTS

M. H. DIELS
Comptroller

SERVICES

General Services
Research & Planning
Engineering Services
Electric & Gas Operations

Residential Sales Services
Commercial Industrial Sales Services
Area Development
Gas Market Development
Electric Market Development
Advertising Services
Public Information

Cost Measurement
Systems & Methods Services
Budget Services

The APS organization is not a system of lines but a system of ideas. The idea that the president must not be uncommunicably far from any manager. The idea that the division organizations must be self-sufficient in those operations where this is practical and economical. The idea that every job has line responsibility to perform. These ideas, and the people who believe them, are what count.

APS ORGANIZATION CHART

Organization is a system for optimizing people's performance within the framework of a philosophy of doing business. Organization, then, must be subservient to people and to the corporate objectives

CORPORATE GROUP

F. W. SMITH
Secretary and Assistant Treasurer

MANAGEMENT

CUSTOMER SERVICES

W. P. REILLY
Vice President

FINANCIAL

JOHN L. LIECTY
Treasurer and Assistant Secretary

MANAGEMENT SERVICES

D. B. McGREGOR
Vice President

MANAGEMENT

Accounting Services
Credit & Collections
Rate Services
Financial Services
Computer Services
Computer Research
Internal Audit

Industrial Relations
Organization Development
Personnel Services
Employee Development
Employee Communications
Space Planning
Tax Evaluation

OPERATING MANAGEMENT

Cochise Division
Gila Division
Metropolitan Division
Navajo Division
Pinal Division
Western Division
Yavapai Division
Wickenburg Division
Yuma Division

THE CLIMATE'S YIELD—ACHIEVEMENT

THE COMPANY CARRIES its forward-thinking external approaches to its internal operating procedures. All of the many ways that operating procedures have been improved could not be chronicled here. Some, however, are worthy of special note.

Arizona Public Service was the first Western utility to install a large-scale Univac electronic data processing system. Incidentally, the 63 people who were required to staff the Univac center were recruited from company personnel through the job-bidding system.

So far as is known, Arizona Public Service was the first company to employ an airlift for transmission line construction purposes. This was not an airlift in the conventional sense that it utilized helicopters to move equipment but rather a program that ferried line crews from Phoenix to the remote area in which the line was being constructed. Economic studies indicated that the air transport, because of its speed, provided better economics than moving the crews into position by conventional line trucks.

ENGINEERING ADVANCES

A fair appraisal of the engineering advances at APS requires the recognition that the company has had to take on three conflicting engineering assignments simultaneously.

1. **Modernization of the existing system** has been a pressing necessity. Distribution work such as the increase of distribution voltages from 4 to 12 and 20 kv —the reduction of losses through the use of capacitors— has enabled the company to reduce system losses from 13½% in 1952 to 9% in 1960. This type of modernization has been a contributing factor to the company's ability to hold the over-all cost per kwh for producing, transmitting and distributing power at essentially the 1952 level.

2. **Growth in the order of 12 to 14%.** Company generation has jumped from 196 mw in 1952 to 637 mw in 1960—will double this figure by 1965. This rapid growth has forced the company to build, in short, a completely new integrated system. Growth of this magnitude makes it impossible and unwise to rely on "standard practices."

3. **Plans for Tomorrow.** Projected growth in the Public Service territory is not decelerating. As a result, APS engineers are today planning for degrees of system automation for plant sizes and capacities that are not necessary today, but which will clearly be required in the next few years. The size of the APS power system that looms on the horizon has caused the engineering department to design an automatic digital dispatch processing system, which will include data gathering and control functions as well as optimization, power system simulation studies for planning, and ultimately monitoring and control of transmission line performance. Completion of this system is set for five years hence when the system has grown into today's plans. Meanwhile, the problem is being given searching engineering analysis.

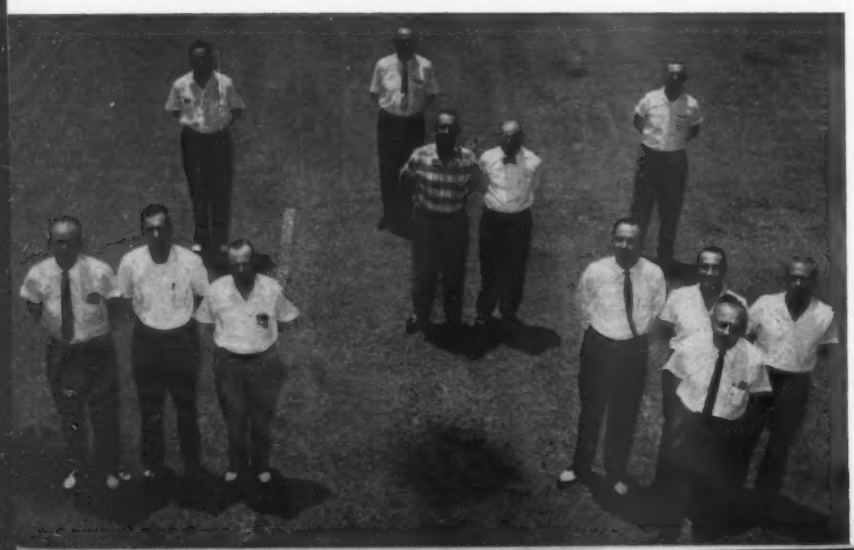
Another contrast to design by "standard practice" is the APS penchant for programming design. To provide an economic and effective distribution design tool, a digital computer program is under development that will permit the distribution engineer to design the most economical distribution subtransmission system. Using inputs such as customer density, distribution and subtransmission voltage, the program will determine the number and size of substations, locations, conductor sizes, optimum secondary network, etc.

In still another program, the structural design for transmission and substation towers will be handled by computer. By using inputs such as mva, voltage, short circuit requirements and land and loading requirements, the designs will be completed and with no freezing of advances in the art of structural design.

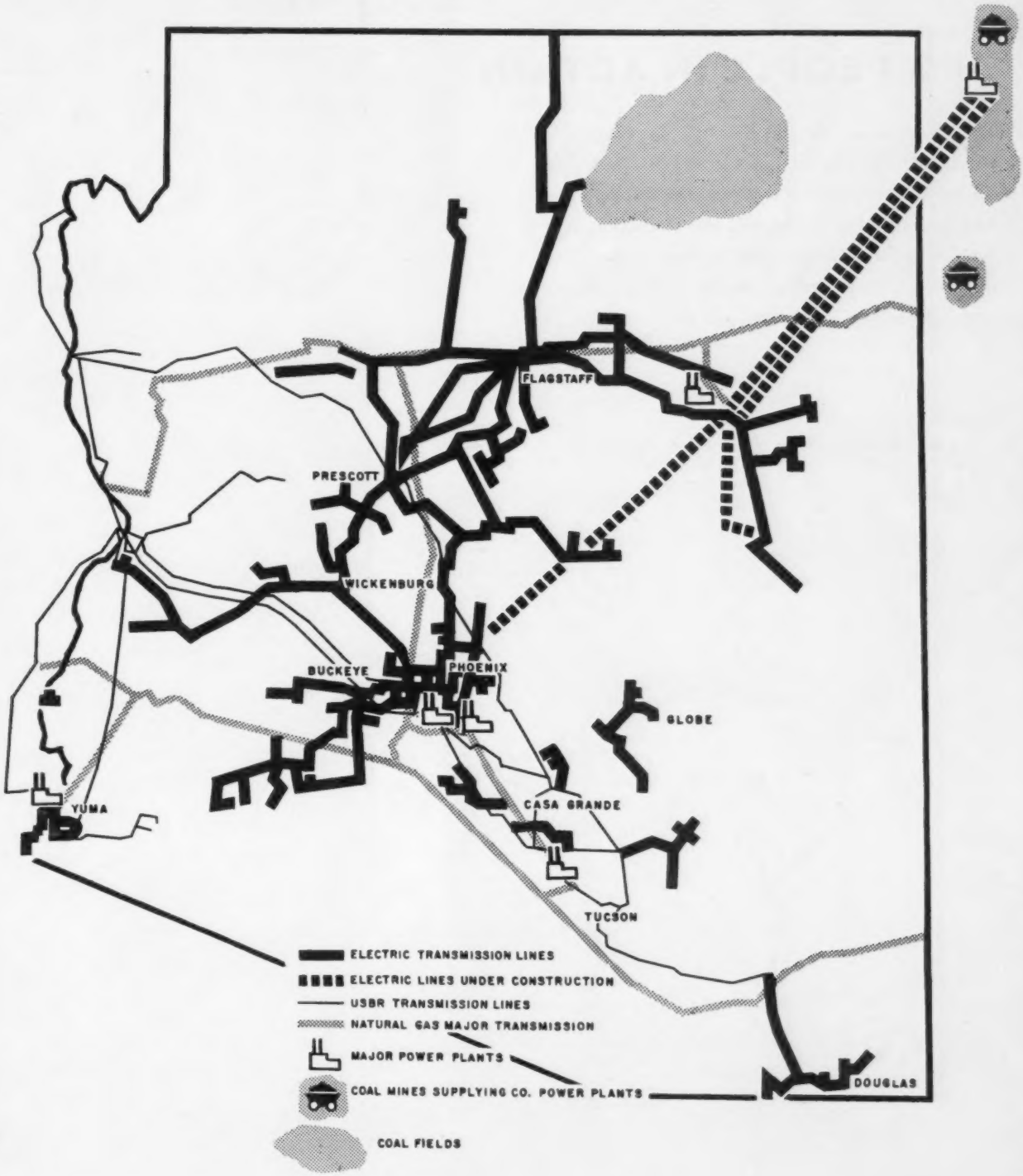
In still another program, engineers are studying the use of a computer controlled plotting device that could be used to up-date the tremendous volume of company maps as changes take place on the system.

These dividends of man-freeing computer programs are the result of Public Service Co.'s willingness to

(Continued on page 56)



"My job is knowing where we're going and being ready when we get there." This group of top people is but a sample of the company's commitment in future planning



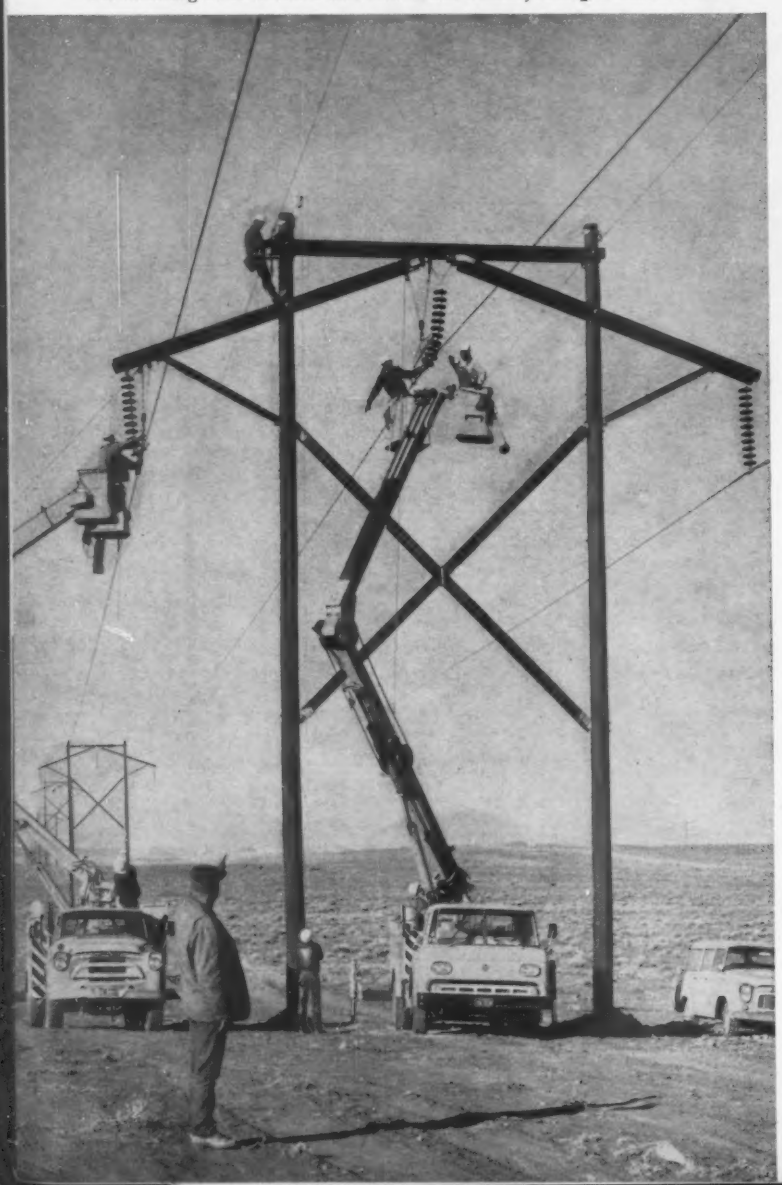
ENERGY RESOURCE MAP

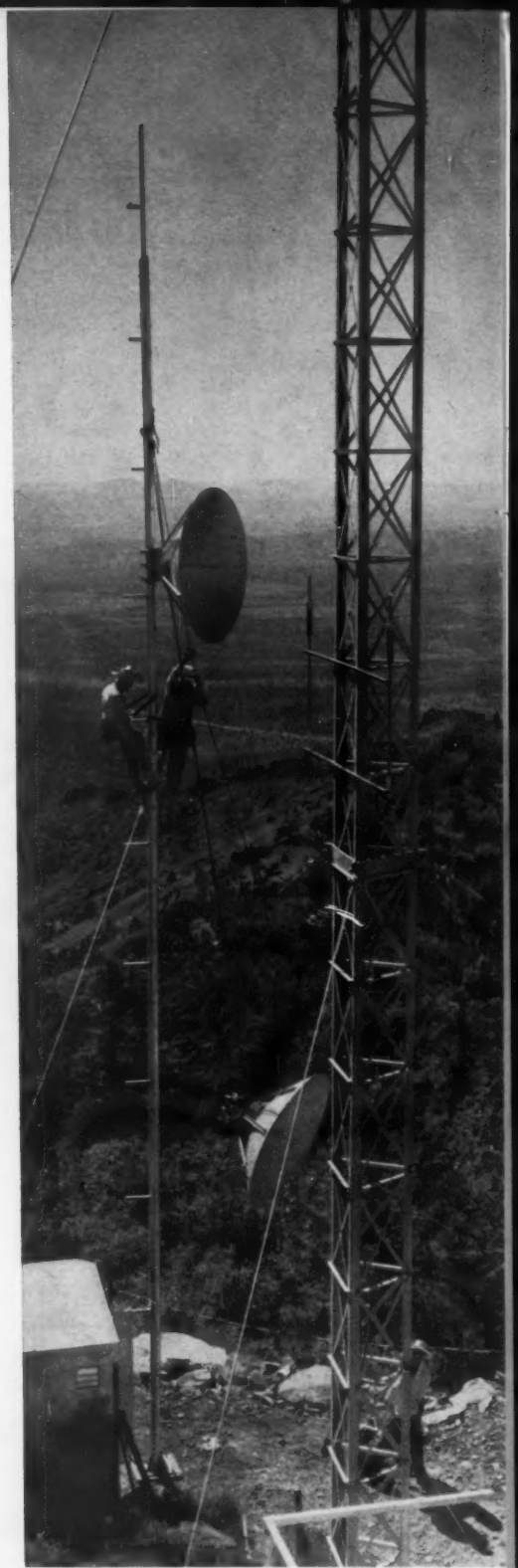
ARIZONA's existing generation and major transmission are shown. Enormous quantities of coal in northeastern Arizona and over the line in Utah, Colorado and New Mexico promise low-cost energy in the area for years to come

APS PEOPLE IN ACTION

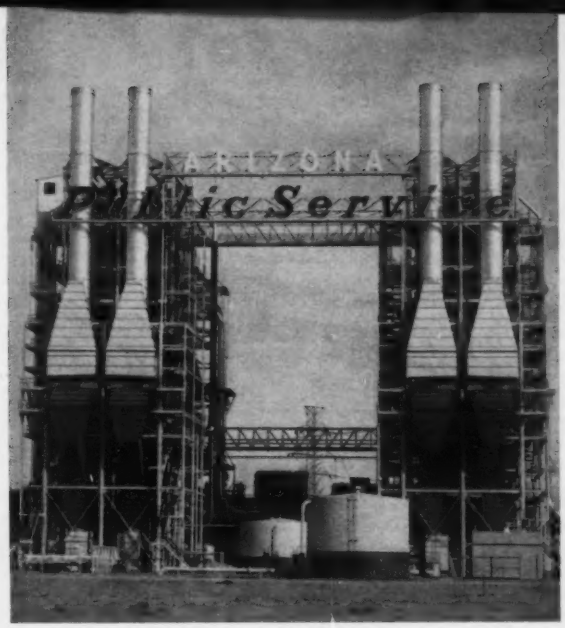
Construction activity on the APS system is similar to the rest of the country, except that an occasional Stetson replaces the hard hat and some of the backdrops are exquisite. The rate of construction on the system is the difference. Major generating units have been coming on the line at a rapid rate

MODERN MAN-LIFT equipment that speeds the completion of the important 230-kv link connecting Leupp to the site of the new Cholla steam plant. Forthcoming Four Corners line will be the country's longest 345-kv link

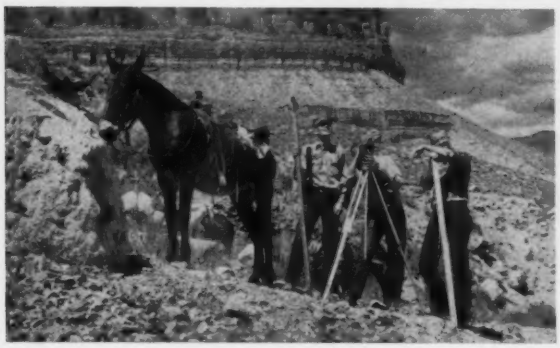




OUTSIDE METROPOLITAN AREAS, customer density in Arizona is extremely low. Long distance, sprinkled with high mountains make an ideal climate for microwave communications



THE OCOTILLO plant pictured above, most recent addition to the company's family of power stations, will be shortly followed by the coal-fired Cholla and Four Corners plants



HORSES AND MULES supplied the locomotive power for the survey crew whose job it was to build a nearly invisible line into the depths of Arizona's famed Grand Canyon

APS LINEMEN are able to enjoy the scenic beauty provided by the colorful hills of Oak Creek Canyon. New 20-kv distribution primary voltage is on the increase in rural areas

BEASTS OF BURDEN that make the line survey above possible couldn't compete with the modern helicopter for the transportation of construction material and personnel from the rim to the steep cliffs along the route into the Grand Canyon

R. N. RUECKER, *Manager*
Valley of the Sun Electric League

How strong is APS in the marketing area? ELECTRICAL WEST asked a man whose job well qualified him to know. Dick Ruecker was explicit, "As a supporter of our Appliance Merchandisers Assn. for over 10 years, the Arizona Public Service Co. long ago demonstrated its interest in the appliance dealers and distributors in Phoenix.

"This interest in all industry segments is now evidenced in the support the company is giving our Valley of the Sun Electric League. We are proud of the job Arizona Public Service is doing to maintain the strength of the electrical industry in our area."

The company, through its membership in these groups, works closely with dealers on appliance campaigns and through this cooperation, gains the benefit of added sales as new appliances go on the lines. This is cooperation that pays!

(Continued from page 52)

set aside a part of its engineering capability to plan and study for another day. The organization of the engineering department makes this clear. A special group of planners and engineers is set aside to handle these problems which require the unhurried hours of the researcher rather than the designer.

Looking down the line, Public Service engineers look to the application of gas turbines for peaking operations when additional peaking requirements are needed. They are also following with interest the use of coal-fired gas turbines with an eye toward combined cycle operation in their coal areas. They additionally plan to give a long look to gas turbines for spot applications where the single unit might supply the power heating and cooling requirements. They talk about a possible centralized air conditioning and heating service where hot and cold water would be supplied from a central plant. They look with some enthusiasm to the application of guyed V structures for transmission towers. They will have the first radio-controlled locomotive for shuttling coal cars at the new Cholla plant.

It seems reasonable to conjecture that, when the future arrives, Public Service engineers will be there waiting with imaginative designs.

SALES TEAM GETS RESULTS

Naturally a good deal of the company's growth has come from the influx of people into the state and the consequent increase in customers in various classifications. However, most of the additional business comes from an aggressive, hard-hitting sales organization.

Don Willis, the company's marketing vice president, sums up the sales philosophy in a few words: "We feel it is our job to provide our customers with complete information on the latest advances in electric and gas appliances and to assist them in making full and complete use of the services we provide. Just as in every other business, we do our utmost to get what we feel is our fair share of the customer's dollar while, at the same time, providing him with fair value for those dollars that we do receive."

Public Service does not merchandise directly, but maintains close cooperation with appliance dealers throughout the state. In the heavily populated area of Phoenix, the company is an active member of the Valley of the Sun Electric League and a unit of that group known as the Appliance Merchandisers Assn.

From time to time the company does engage in merchandising activities in cooperation with the appliance dealers for the direct sale of small appliances. A recent example of this was an electric blanket campaign put on by the company's sales force in the southern part of the state. This was last summer, mind you, when the thermometer in this part of the state was bouncing between 100° and 110° each day. The company salesmen went door to door, pushing, a "buy one, get one for half price" special deal. In an area of less than 7,000 residential customers, 1,250 electric blankets were sold—1,000 by Public Service people, 250 by dealers. Benefits of the campaign continued even after it was closed through sales of additional blankets by the dealers.

As a combination utility, Arizona Public Service op-

H. R. PETTET, *Business Manager*
Local 387, IBEW District 7

Intrigued by the many kindly references to the local labor management, we made a call on Herb Pettet, IBEW business manager. Over coffee we found Herb is a deliberate, slow spoken man with a fierce pride in his union and his membership.

Says Herb, "You only progress by cooperation. We don't expect to have it all our way, and the company doesn't expect to get it all their way. We just keep plugging away and pretty soon we get together. We've done some pretty good things too. The most important thing is safety. We've made safety a part of the contract. That's important. Another thing, if any of my boys come in here trying to make arguments on an unsafe practice, I tell them no dice."

We were joined by J. T. Carpenter, a Public Service foreman and apprentice program graduate. Never too far from the gaboon, J. T. lauded the company-union cooperation on the apprentice program and safety matters. He explained how most apprentices go through the chairs in the union organization and, as a consequence, are better able to supervise "because they know both sides." Pettet continued, "We've only had one problem in my years that's had to go to arbitration. That's a pretty good record."

erates on the philosophy that the customer should be given all the facts and permitted to choose the type of service that best fits his needs. However, from an operating standpoint the hot summer climate produces a substantial electrical peak from air conditioning and agricultural pumping loads. At this same time the gas division suffers a distinct valley. To more nearly equate these two phenomena in the interests of efficiency, studies indicated that moving a part of the agricultural pumping load from electricity to gas could be made beneficial both to the customer and the company. Thereupon the company embarked on a program of leasing gas engine driven wellhead pumps to farmers who would replace electric motors. Today 34% of the summer base gas load is irrigation pumping. This move might be termed typical of the close attention paid by management to all facets of profitability.

THE COMPTROLLER CONTROLS

Whereas in many companies the position of comptroller is simply that of head accountant, at APS Comptroller Brick Diels places a statistical micrometer on every facet of the company's operation. Diels' basic budgeting work revolves around responsibility accounting. A system whereby budgets move up through the lines of responsibility and authority with each supervisor budgeting all those things—both income and expense—for which he has primary responsibility. Says Diels, "We're not budget bound, it's just that good budgets become an invaluable planning tool and in a company growing as fast as ours it's essential that you know with some accuracy where you're going to be three, four or five years from now." To further implement the company's control, Diels' department releases monthly a detailed report of actual compared with budget, which enables each supervisor to see in chart form how his group is performing against its budget. "We use this to red flag some trouble spots," says Diels.

The second side of the comptroller's function is one of work measurements and procedures. Convinced for some years that most utility work can be measured and, as a consequence, the method analyzed and improved, Diels has fathered a series of seminars on work measurements as a method of bringing to light the total knowledge of the utility industry on the subject. Starting with a handful of people, the work measurements conferences are now a self-sustaining operation attracting leaders in and out of the industry.

"Our policy is not to force the use of work measurement methods, rather to make the skills available to help the supervisors do a better job. Where the methods have been used, we've had some exciting successes in terms of economies and the list of converts seems to be growing."

OPERATING OUTLOOK

Max Llewellyn, who directs the company's central operating and construction force, characterizes himself as "a die hard engineer who finally got the word." He has really got it. Llewellyn points out that, in the years since the merger, APS has grown from what was primarily a distribution company to a company with a number of major generation facilities and what will be the longest 345-kv line in the country.

"Starting from a very small base, we're in the position of having to appoint a new steam station superintendent, train and completely staff a new plant every other year. That's how it's been—Yucca—Ocotillo—Cholla—and we're already making appointments and starting the training for the Four Corners plant.

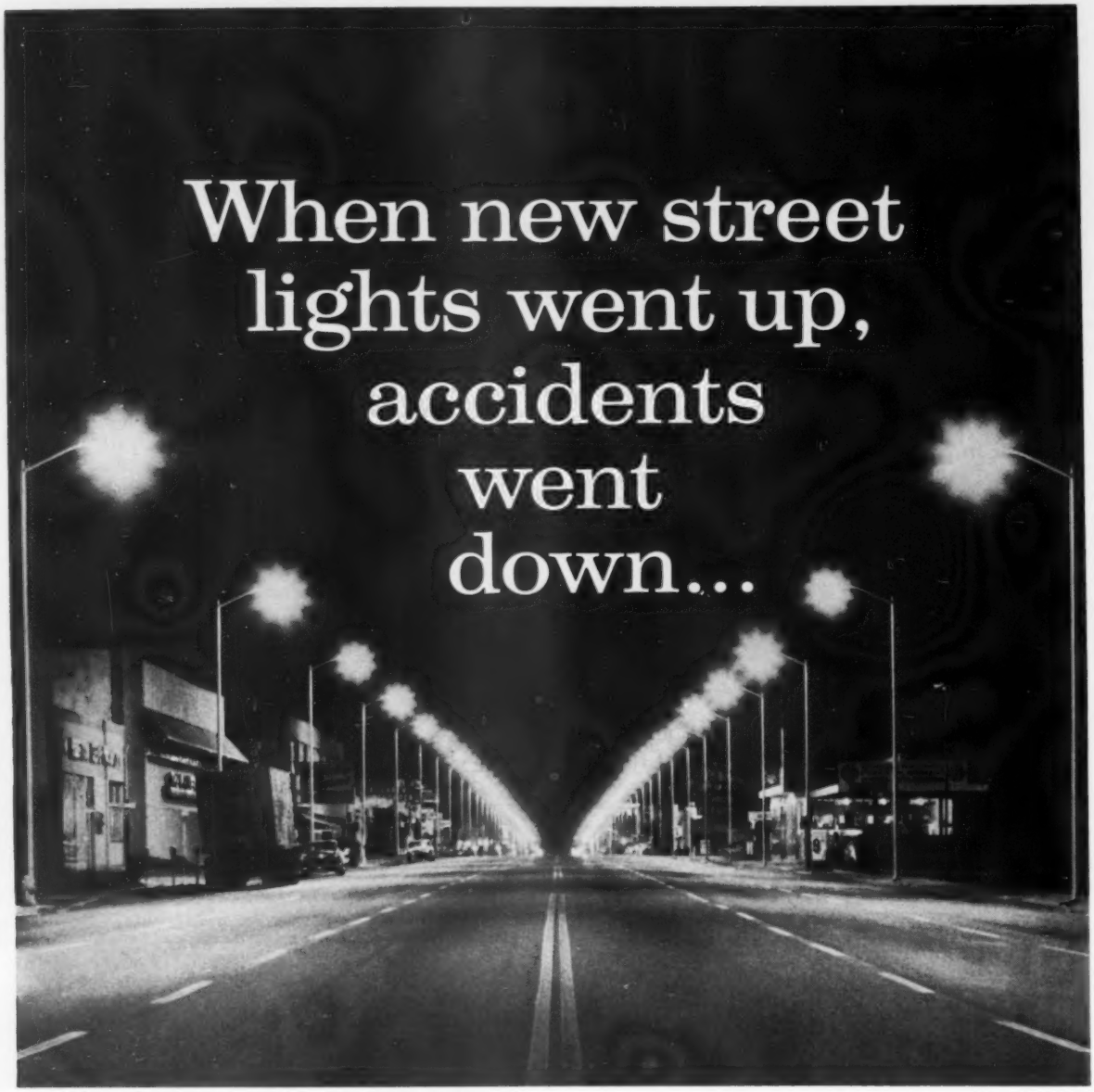
"I'll brag a little bit now," and here Max pulled out a chart showing the company's safety record—no time lost accidents in 1961. "What's happening is that our line crews are holding up the over-all company safety performance."

How come?

"Well, several reasons. Going back some years our safety performance was pretty bad. One of the important factors in our present record is our union people who have played a very constructive and energetic role in furthering safety. Another thing is our apprentice program. These apprentice graduates have a real command of what's going on electrically and this avoids a lot of the boneheaded errors. Also, since we have these apprentice graduates, we haven't had to rely on boomers. Finally, while we have safety people who study to make sure our practices are safe, we have shifted the burden for safety to the individual lineman. We tell him it's his neck and to take care of it. This works a lot better than having a safety engineer barking at him from the ground saying don't do this and don't do that."

TAILGATE CONFERENCE

We wanted to see what line construction was like in 112° weather with the company's apprentice-staffed crews. We asked Lee Lamberson, acting superintendent, if we could make a swing in the field with him. Lee has been with the company 15 years and is a graduate of the first apprentice class. Says Lee, "I told my missus at the end of the war that I was going to drift until I had found a place I'd be willing to work for the rest of my life. Well, here I am 15 years later." The crew we visited was discussing the detail of an upcoming job—a process which is followed carefully by every foreman.



San Pablo Ave., a main thoroughfare of Emeryville, California

"In the year since Emeryville installed these modern street lights on San Pablo Ave., automobile accidents dropped 50%," reports City Engineer Julius Lucoff. And along with this increase in safety came an upswing in business! Ask PG&E to make a free Master Street Lighting Survey, and discover how to make your streets friendlier and safer. Also, pick up the free booklet, "Modern Street Lighting for YOUR Community."

NEW LOW RATES: PG&E has placed new lower rates in effect for mercury vapor street lighting! This passes on the savings resulting from increased efficiency and longer life of the latest mercury vapor lamps.

P·G and E·
Pacific Gas and Electric Company

ELECTRICAL WEST
AUGUST 1961

CONTRACTING & CONSTRUCTION SECTION

STATISTICS / COSTS / PROPOSED PROJECTS / NEW PRODUCTS / NEWS

LATE NEWS FLASHES

Listing Law Not Altered

Subbidders listing law in California, which was subjected to many pressures for amendments during the recent legislative session, stays as it is. The amendments were held in committee and if they are to emerge next session must do so at the behest of the rules committee, which may submit them to interim study. Instead a bill to strengthen the penalty provisions on the subbid listing law was passed and signed by the governor. He also signed bills passed affecting the Contractors License Law as to owner exemption, fixture exemptions, adding a lay member to the board and several others.

Seattle Sets Training Fund

A joint fund for apprentice and journeymen electrician training has been established in the new contract between the Puget Sound Chapter, National Electrical Contractors Assn., and local 191, IBEW, in which both the union and the employers will contribute ½c an hour for every hour of productive pay roll. It became effective July 1. The fund is estimated to provide about $4,000 yearly for the training program, Maynard Sundt, chapter manager, declared.

Air Conditioning Agreement With Sheet Metal

Two groups of air conditioning contractors have signed a four-year agreement with the Sheet Metal Workers Union local 108 in Los Angeles which will raise the wages of the 4,000 members by a total of 91c hourly over the four years. The initial boost of 15c became effective July 1; the remainder to come along in yearly raises. Included are six paid holidays and an increase in health and welfare. Contractor groups signing were the Sheet Metal & Air Conditioning Contractors of Southern California and the Institute of Heating & Air Conditioning Industries.

(Continued on page 84)

Page 72 NEW PRODUCTS
ESTIMATOR'S GUIDE
86 PROPOSED WESTERN PROJECTS
80 READER SERVICE SECTION

NEW FROM LAPP

WHY ANOTHER SUSPENSION INSULATOR?

Specifications for transmission line insulators almost unanimously call for "Standard 10-inch disc, 15,000-lb. suspension units." Physical dimensions of this insulator have not changed significantly in 40 years. But manufacturing techniques and qualities of materials have. Thanks to compression glaze, compression sand bands, ever-better porcelain body, improved manufacturing controls and minor cap-head-and-pin design improvements, Lapp's standard 15,000-lb. suspension disc routinely tests today to an M & E strength of just about 25,000 lbs. Yet, a great majority (probably more than 75%) of transmission lines in service today—and of those now being constructed—impose working loads on insulators of only a few hundred to perhaps 4,000-5,000 pounds.

For use on lines so lightly-loaded, it seems economically unwise for you to be required to specify —and pay for—an insulator with strength characteristics you don't need—and can't use!

WHAT IS THIS NEW INSULATOR?

Lapp calls it "Hi-F" (for "high-efficiency" of course). Its 9″ diameter disc is 1″ smaller than the "standard" unit. Its head also is 1″ smaller in diameter. Electrical characteristics—leakage distance—string flashover, wet, dry and impulse—are therefore the same as current NEMA standards for the 15,000-lb. insulator. Hi-F is rated 14,000 lbs. combined M & E strength, and is recommended for service with an adequate safety factor at working loads up to 7,000 lbs. Impact strength rating is 55 in-lbs., identical with the NEMA standard 10″ unit. Hi-F uses the same ball-socket details, so is physically interchangeable with NEMA standard 15,000 and 25,000-lb. suspension insulators.

HOW IS ITS RELIABILITY ASSURED?

Lapp has always maintained that stresses and strains in a suspension insulator over its lifetime of service are complex and subtle factors. So subtle indeed that any significant change from time-tested design carries with it a hazard to reliability.

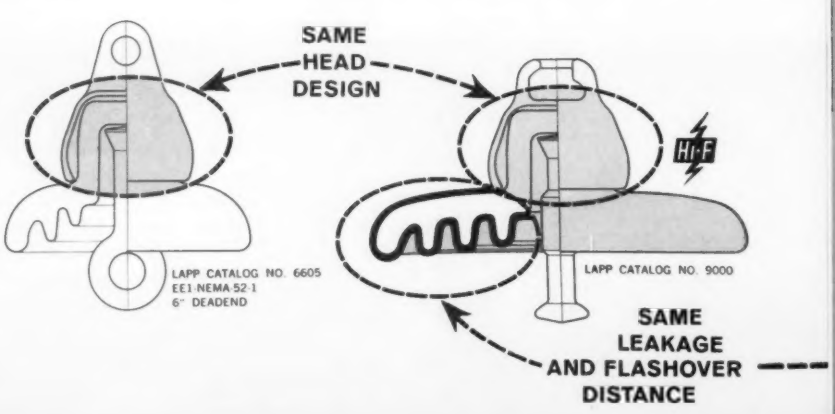
HIGH-EFFICIENCY

"COMPACT MODEL"

SUSPENSION

INSULATOR

FUNCTIONAL DESIGN FOR "NORMAL" TRANSMISSION DUTY ...AND INTERCHANGEABLE WITH NEMA STANDARD INSULATORS



That's why Hi-F is a new design that's made up only of time-proved "components." The cap-head-and-pin design is that of the Lapp No. 6605 6" dead-end insulator, which is time-proved by more than 30 years of successful and distinguished service (and which, with an M & E rating of 10,000 lbs., has routinely been testing at 16,000 to 19,000 lbs.).

Because the cap of Lapp Hi-F is 1" smaller in diameter than that of the 15,000-lb. standard unit, identical electrical characteristics are provided by a shell that also is 1" smaller in diameter.

Design of Lapp Hi-F, then, is a *combination* rather than an *innovation*. All components are of time-proved design; Lapp's progress in manufacturing techniques, control and material quality, permit their combination in the first "functional design" suspension insulator in more than a generation.

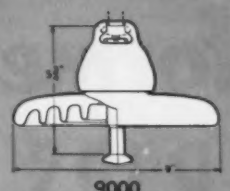
HOW ECONOMICAL?

Designed for "normal duty" transmission lines—and not extravagantly over-designed—Lapp Hi-F carries a substantially lower price than the conventional 10" insulator. Weighing about one-third less, it costs less to handle in the field, offers a smaller target for stones and bullets, and may be worked more easily with hot-line tools. Fairly priced at $2.50 (in 24,000 lb. lots), Lapp Hi-F offers economy to the user, at a price that affords fair profit to the manufacturer. Sample units are now available.

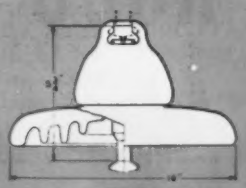
WHERE CAN Hi-F BE USED?

Lapp Hi-F provides an adequate safety factor for any suspension use up to a working load of 7,000 lbs. It is ideally suited to all substation and sub-transmission dead-ending. It is within the loading range of practically all wood-pole construction, as well as that of light or medium-weight steel tower lines—at any voltage. Even at the upper end of the strength scale, Hi-F will often be found to be adequate for use in the suspension position, with high-strength 10" discs used for dead-ends.

ONLY FROM LAPP Hi-F



9000



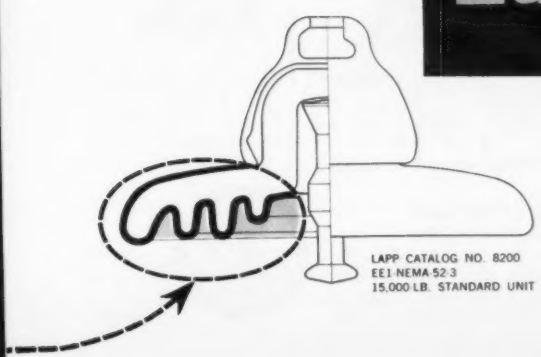
8200

5960 A

Another insulator choice to help you specify what you need and pay only for what you require

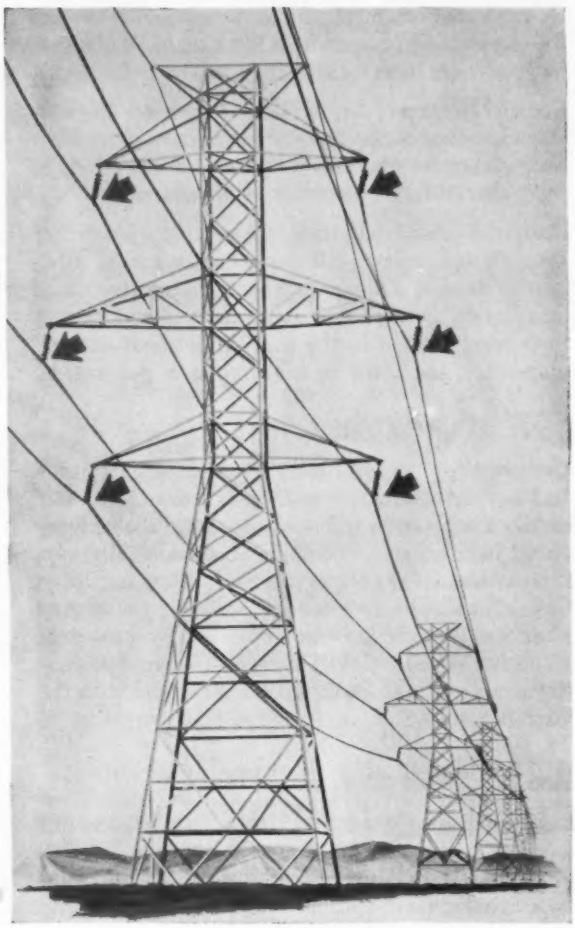
Catalog Number	Hi-F 9000	8200	5960A
EEI-NEMA Class		52-3	52-5
DIMENSIONS			
Leakage Distance, Inches	11.5	11.5	11
Dry Arcing Distance, Inches	7.75	7.75	7.75
MECHANICAL VALUES			
Combined M&E Strength, Pounds	14,000	15,000	25,000
Impact Strength, Inch Pounds	55	55	60
Routine Proof Test Load, Pounds	7,000	6,000	10,000
Time Load Value, Pounds	10,000	10,000	15,000
ELECTRICAL VALUES			
Low Frequency Dry Flashover, kv	80	80	80
Low Frequency Wet Flashover, kv	50	50	50
Impulse Flashover—Positive, kv	125	125	125
Impulse Flashover—Negative, kv	130	130	130
Low Frequency Puncture Voltage, kv	110	110	110
RADIO INFLUENCE VOLTAGE DATA			
Test Voltage—Rms to Ground, kv	10	10	10
Maximum RIV—Microvolts at 1000 kc	50	50	50
PACKING AND SHIPPING DATA			
Net Weight, Each, Pounds	7.4	11	13.5
Packed Weight, Each, Pounds	7.75	12	15
Standard Package	6	6	6
PRICE			
24,000 lb. Shipments	**$2.50**	**$2.92**	**$3.70**
Less 24,000 lb.	**2.60**	**3.05**	**3.85**

Lapp



Lifetime protection for less than 1/4 cent per T-Line dollar invested ...with FANNER Superformed* ARMOR RODS

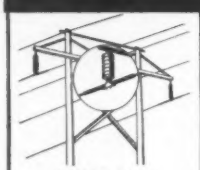
at these vulnerable points



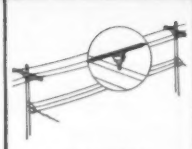
For only a fraction of a penny per transmission-line dollar invested . . . Fanner SUPERFORMED armor rods give lifetime protection to conductors at vulnerable supporting points.

Top-quality products of the world's FIRST MAKER of machine-formed armor rods . . . Superforms are uniformly strong, dimensionally accurate, smooth surfaced, easy to install. Available for all conductor types and sizes. Learn how little so much extra protection costs. Call today.

A FEW FANNER Superforms AND FINEST PLASTIC PRODUCTS

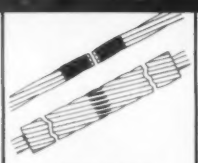


ARMOR RODS . . . Protect long spans at supports



LINEGUARDS . . . Protect short spans at supports

FANNGRIPS . . . For dead-ending strands or conductors



FANNSPLICES . . . For joining or patching strands

Plastic TREEGUARDS . . . Protect conductor surface covering

Plastic KOVER-GUARDS . . . Protect surface-mounted conductors

*A superior forming method in accordance with Patents No. 2,769,478 and 2,588,663—other patents applied for.

THE FANNER MANUFACTURING COMPANY
Brookside Park • Cleveland 9, Ohio

DIVISION OF TEXTRON, INC.

Fine Fanner Superformed Products

A-4545A

For phone number of closest representative see advertising index in back of book.

PEOPLE

Westerners Honored

Four Westerners are among the 17 AIEE members recently elevated to the grade of Fellow for outstanding contributions to their profession. They are President Carl C. Ernst of California Electric Power Co. "for contributions to the development of a rapidly expanding and changing electric power system"; Harry J. White of Portland State College "for contributions to the theory and practice of electrostatic precipitation"; Harry H. Cochrane, engineering consultant for Montana Power Co., "for contributions to economical power generation and transmission for an extended system"; Earl S. Condon of the Earl S. Condon Co. "for contributions to power insulator improvements and protective and distribution equipment for aircraft."

► **Hugh Cocklin** has been named superintendent of Arizona Public Service Co.'s Four Corners power plant. He will continue in his present post as superintendent at Saguaro until construction at the Four Corners plant is further along. Cocklin started with APS in 1949 at the Phoenix power plant. He went to Saguaro in 1953 as results engineer and was made plant superintendent in 1959.

Cocklin

► **William J. Hanna,** associate professor of electrical engineering at the University of Colorado, was elected chairman of the Denver AIEE section. He succeeds **Wayne L. Smith,** electric utility representative in the Rocky Mountain region for Allis-Chalmers. A member of the CU faculty since 1946, Hanna is a member of the committee preparing for the AIEE national convention in Denver in July 1962.

► **W. A. Stevenson** is now supervisor of power supply and scheduling for Arizona Public Service Co. He joined the company in 1946, and before his appointment to the new job had been staff production coordinator in power supply.

► **Ray J. Larrabee,** well-known service engineer for Underwriters' Laboratories in the Western states, retired after 40 years with the organization. He joined the laboratories in 1921 as assistant electrical engineer in San Francisco and in 1935 became a field engineer, in 1945 advanced to service engineer in the label service department. He has been prominent in IAEI affairs.

► **Ken E. Hollingsworth,** sales utilization engineer for Puget Sound Power & Light Co., was elected president of the Puget Sound Electric League. New league directors are Thomas E. Sparling, electrical engineer; D. B. Eardley, Northwest district manager for Graybar; and Fay E. Hudson of the Washington electrical inspection department.

► **John I. Yelliott,** Phoenix consulting engineer, one of the American participants in the United Nations conference on new sources of energy being held in Rome Aug. 14-28, will report proceedings for ELECTRICAL WEST. Fifty-six nations and more than 500 delegates will discuss the three topics—solar energy; geothermal energy applications; and wind power.

► **Carrol W. Brissenden,** Portland General Electric Co.'s general sales manager, has been appointed chairman of the training committee—responsible for the training of "loaned executives"—for the 1961 Portland United Good Neighbors campaign.

► **J. J. Gauger** has been promoted to office manager of Portland General Electric Co.'s sales department. He succeeds **W. E. Hudleson,** who retired after 45 years with PGE. Gauger has been office manager of PGE's Gresham Division.

► Kittitas County PUD has appointed **Ray Perry** of Goldendale as its manager. He has been with Klickitat County PUD since 1948 and was assistant manager before he moved to his new office in Ellensburg.

► **Col. Walter L. Winegar,** Portland U. S. Army district engineer for the past three years, will leave for Vietnam on Aug. 21 for duty with the U. S. Military Assistance Advisory group at Saigon.

► **James McCollum,** manager of advertising and publicity for Pacific Gas and Electric Co., was named president of the San Francisco Advertising Club for the coming year.

Bauer

Hoover

► **Albert Bauer,** general manager of system operations for Pacific Power & Light Co., and **Veryl N. Hoover,** manager of its Wyoming Division, were made vice presidents effective with the recent merger of California Oregon Power Co. into PP&L. Before joining the utility in 1955 as assistant chief engineer, Bauer was associated with Woodbury & Co., Portland. Hoover, an executive with Mountain States Power Co. when it was merged with PP&L, was assigned to the Wyoming post in 1956.

► **Vincent O. Burns** has been made Puget Sound Power & Light Co.'s Northern Division manager to succeed John F. Wallin, recently elected vice president - operations. Burns started with the company as a clerk in 1930 and was in the general accounting department for 25 years. He became assistant to the president in 1959 and executive assistant to the treasurer last year. He most recently has been serving as executive assistant to the operations vice president.

Burns

► **Everett C. McKeage** has been unanimously re-elected by his fellow commissioners to serve a third term as president of the California PUC. He was appointed to the commission in February 1959, after serving for 14 years as its chief counsel.

► **C. H. White** has been elected chairman, Vancouver, B. C., branch, Engineering Institute of Canada. D. R. Bakewell is vice president; T. C. Covello, secretary; and I. A. Broddy, treasurer.

► **Dr. Stephen J. Angello,** project manager in the Westinghouse new products laboratories, has been named visiting Mackay professor of electrical engineering at the University of California in Berkeley.

G&W CABLE NIGHTCAPS

Seal Unfinished Cable Joints Against Moisture And Dirt

Cable splicing no longer need be one continuous operation when G&W Cable Nightcaps are used. Unfinished cable joints or terminations can be left overnight or for several days at a time with complete assurance that work will remain dry and clean as when sealed.

The G&W Cable Nightcap consists of a heavy plastic sleeve, waterproof paper to keep the plastic clean, tape, desiccant, and humidity indicator. The sleeve is slipped over the unfinished joint and one end taped tightly to the cable. Desiccant and humidity indicator are then inserted into the sleeve and its remaining end taped to the cable on other side of the joint. Waterproof paper is laid over the sleeve for protection.

Further information on the Cable Nightcap is available from G&W Electric Specialty Company or consult your local G&W representative.

G&W ELECTRIC SPECIALTY COMPANY
3506 WEST 127th STREET • BLUE ISLAND, ILLINOIS
CANADIAN MFR. • POWERLITE DEVICES, LTD.
TORONTO, MONTREAL & VANCOUVER

Superior quality standards—inspired specialized design J61-1

ONE CALL FOR ALL TOP BRANDS

BETTER PROTECTION

NEW ENGLAND Mica · Dolphi VARNISH · SUFLEX TUBING · DOW CORNING SILICONES · FORMICA LAMINATES · COPACO PAPER · DU PONT TEFLON LECTON ARMALON · JOHNS-MANVILLE Dutch Brand TAPE · ELECTRO-TECH FLEXIBLE INSULATION · COLUMBIA TAPE

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Your electrical-electronic products are better protected when you insulate with quality materials. You can sell peak performance because you are using components of known integrity.

Each insulating product offered to you by TRI-STATE has superior dielectric properties, heat endurance, physical stability, and resistance to detrimental action of various substances.

For immediate delivery on insulation — or wire, tools, winding equipment, brushes, bearings, capacitors or commutators — call

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San Francisco 7 • 554 Bryant St. EXbrook 2-8890
Seattle 9 • 325 Westlake Ave., N. MAin 2-4161

Send for factory catalogs—they're free

► **William A. Galbraith,** former Portland area manager for Bonneville Power Administration, has been made power marketing specialist in BPA's new power management division. Before joining BPA in 1957, he headed conservation and development activities for the State of Washington and was a member of the state's gas and oil commission and forest board.

Galbraith

► **Ralph M. Brody** of Fresno has been elected chairman and **Samuel B. Morris** of Los Angeles vice chairman, California Water Commission.

Deaths

► **George Albert Lloyd**, southern California sales manager for General Electric Co. until his retirement last March, died following a heart attack at his home in Altadena. He was 62 years of age.

► **Thomas R. Myers,** 77, publicity manager for B. C. Electric at Victoria, B. C., for many years, died recently. He joined B. C. Electric in 1908 and took over the publicity department and editorship of the Victoria edition of *The Buzzer*, company publication, in 1916. He retired in 1949.

► Funeral services were held June 16 for **William C. Rowse,** a member of the Los Angeles Department of Water & Power from 1928 to 1949. He was at one time in charge of steam design and had worked on Hoover Dam and the department's Harbor steam generating plant.

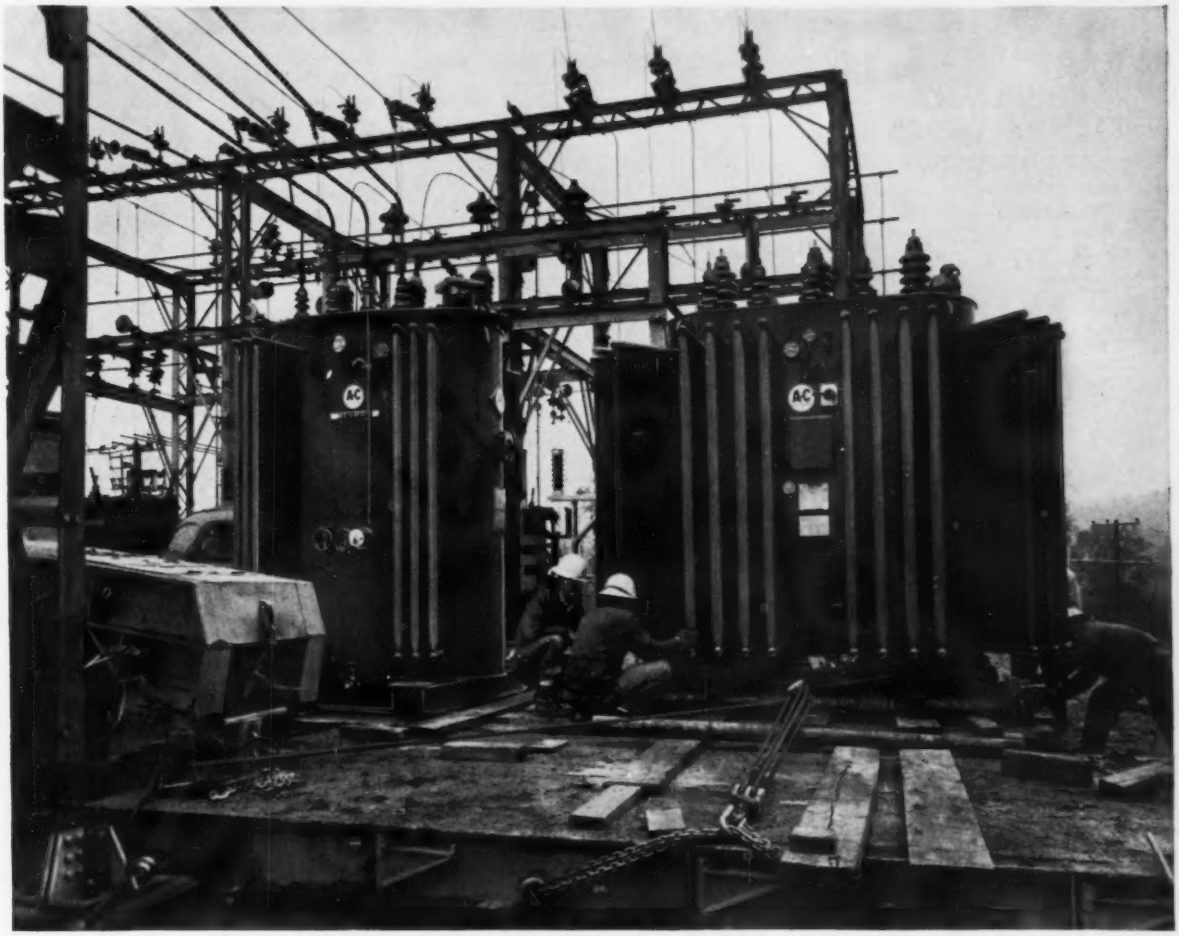
► **"Sandy" Sanderson,** an electrical pioneer in British Columbia and until retirement a year ago chief electrical inspector, city of Vancouver, died recently.

► **Joseph C. Mills,** assistant supervisor of customers' service for Portland General Electric Co., died June 11.

► **Byron H. Martin,** the first electrical engineer to join the Metropolitan Water District, died June 18 in Pasadena.

► **Lou Kaplan,** 51, owner of U. S. Supply Co., Los Angeles, died of heart attack recently.

ALLIS-CHALMERS



New small power transformer increases station capacity from 2500 kva to 5000 kva with minimum alteration.

With new low-silhouette power transformer...

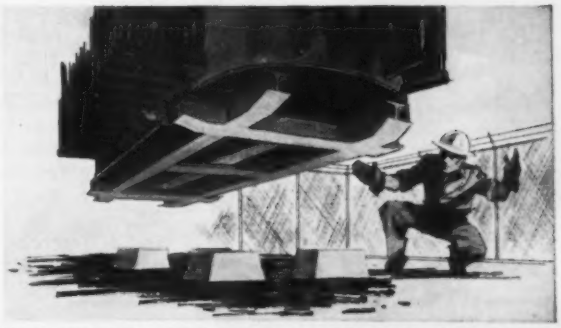
100% more capacity without raising "overhead"

West Penn Power Company installed this compact new A-C 5000-kva transformer to replace an existing 2500-kva transformer without raising the overhead structure!

You too can solve rising substation load and space problems.

Now A-C units can replace your old transformers — deliver as much as a 30% increase in kva without any increase in unit size or weight! You never need alter your base mounting (no weight increase) or your overhead structure (no height increase).

These units, offered in 7500 kva, 69 kv and below, feature reduced losses, decreased exciting current and lower noise level. *Call your nearby A-C office for details or write* **Allis-Chalmers,** *Power Equipment Division, Milwaukee 1, Wisconsin.* A-1438



New base design, reduced transformer weight cut foundation size and cost. No external tank bracing to catch dirt. Clean design makes painting easy.

For phone number of closest representative see advertising index in back of book.

Now Available... the EASIEST CLINCHING fitting in the industry!

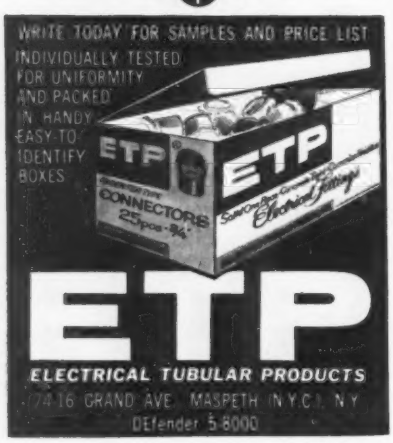
ETP INDENTER COUPLINGS & CONNECTORS

■ Special Soft Steel for Easy Crimping
■ Solid One Piece ■ Rolled Thread
■ Concrete Tight ■ Competitively Priced ■ ½", ¾", and 1" Sizes.

ETP makes clinching easy with this new type coupling and connector. **A dead soft steel**—especially formulated and processed —is used for easy crimping.

- Precision rolled thread for 65% greater strength.
- One-piece solid tubular steel — cannot open or spread.
- Sparkling corrosion-resistant zinc chromate overplating.
- Far exceeds requirements of UL file card No. 24788.

CONNECT WITH ETP FOR ECONOMY!



MANUFACTURERS AND DISTRIBUTORS

Price Changes

Line Materials Industries has announced a new and very simple method of arriving at its net selling cost. The formula reads "realistic cost + reasonable return = net price."

Officials report that by applying this formula to every item in the construction materials line, they have been able to reduce the price of many items. However, on some items, it was revealed to them that they had been selling them at a loss in order to stay competitive.

Company officials claim they have become convinced that the only fair way to price these materials is to consider each item individually; apply this formula outlined above; and offer it in the market place at the resultant price.

Most affected by the pricing change were porcelain, anchors and transformer hangers. For example, the over-all anchor line average price was 4.2% lower. The single suspension insulator price was raised approximately 3.9%.

The company also announced that it had established four price zones instead of five. The prices for each of these zones will be composed of the same basic prices plus average freight to the appropriate zone.

General Electric's medium transformer department announced new published prices on transformers 501 through 10,000 kva all voltages, effective July 3.

Fisher-Pierce Division of Sigma Instruments has announced new prices on its individual luminaire mounted controls. The new prices reflect major cost reduction and product improvement and average 15 to 20% off the previous pricing, according to M. D. Dingman, sales manager.

► Announcement by Lapp of a **new compact, high-efficiency suspension insulator** gives evidence of a break in EEI-NEMA standard ratings for these units. The nonstandard insulator has a 14,000-lb. M&E strength rating, is 9 in. in diameter and one-third lighter than the standard 52-3, 15,000-lb, 10-in. unit, but is identical otherwise in rated characteristics and is interchangeable with it. Announced price is 14% lower than the standard insulator's price of $2.92.

► **Pittsburgh Standard Conduit** Co. has purchased the principal assets of **Wagner Products** Co. of Decatur, Ill., and will operate it as the Wagner Fittings Division. **Franklin McDermott,** vice president of the fitting company, will be vice president of the new division with headquarters in Chicago.

► **Afton-Lemp Electric** Co. of Boise has been named a distributor for **Allis-Chalmers** transformers. Located at 620 S. Ninth St., the company will handle sales in parts of Idaho and Oregon.

Kearney Sets Up West Coast Regional Office

Appointment of Dean Cady as manager of its newly created West Coast region was announced recently by the James R. Kearney Corp. Cady, who was formerly with Maydwell & Hartzell in San Francisco, will be responsible for sales and operation of the region, which is headquartered in a new office at 1299 Bayshore Highway, Burlingame, Calif.

Cady

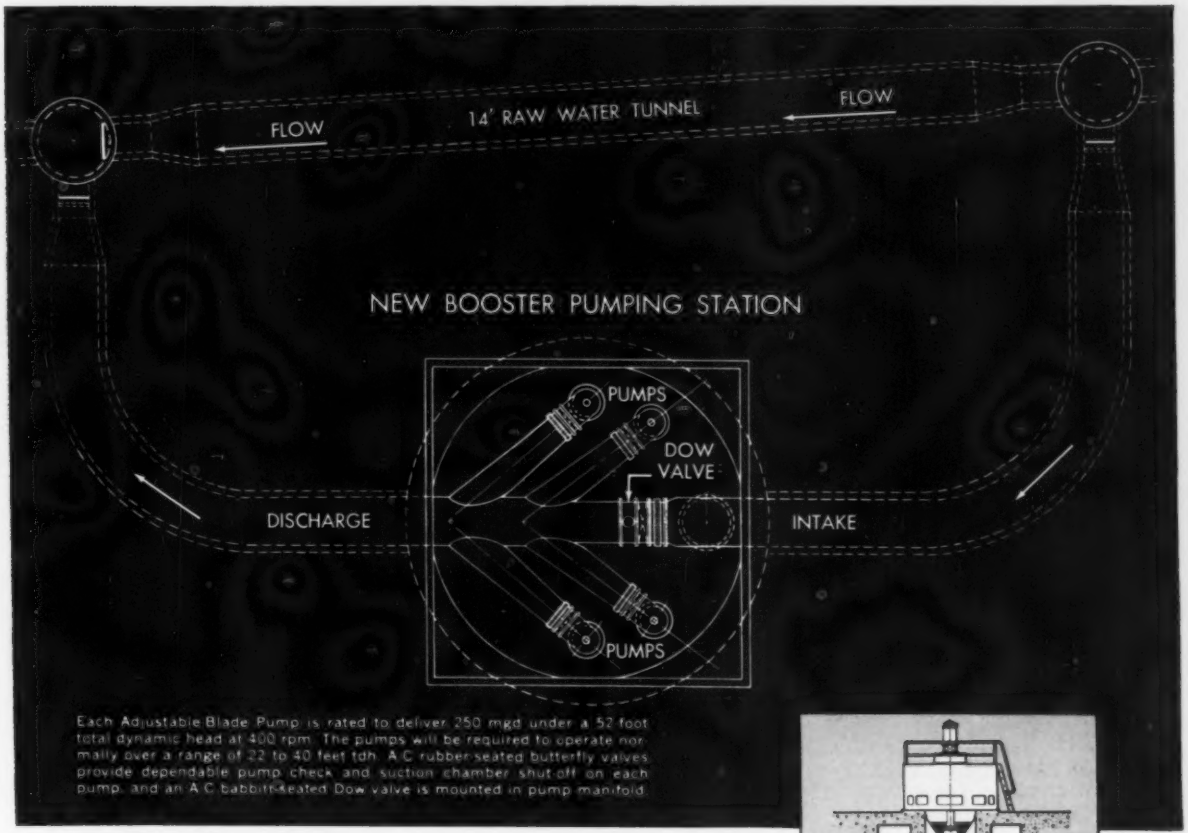
Maydwell & Hartzell will continue to operate in the region as a distributor for Kearney and will work closely with Kearney sales representatives in the area.

Manchester

Mayers

W. L. Manchester has been named Kearney representative for the Los Angeles area with headquarters at 430 Foothill Blvd., LaCanada, Calif. Manchester also was with Maydwell & Hartzell. Kearney representative for the San Francisco area is Robert W. Mayers, at one time with Pacific Gas and Electric Co. and more recently with A. B. Chance. Mayers will operate from the West coast regional office.

ALLIS-CHALMERS



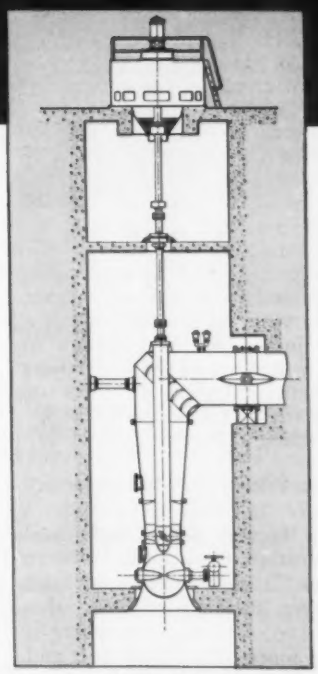
Each Adjustable-Blade Pump is rated to deliver 250 mgd under a 52 foot total dynamic head at 400 rpm. The pumps will be required to operate normally over a range of 22 to 40 feet tdh. A-C rubber-seated butterfly valves provide dependable pump check and suction chamber shut-off on each pump, and an A-C babbitt-seated Dow valve is mounted in pump manifold.

A-C Adjustable-Blade Pumps help City of Detroit augment raw water supply!

To augment the supply of raw water, Detroit, Michigan has installed four A-C Adjustable-Blade Pumps in a new booster pumping plant near the Detroit River. Pumps of this type were selected for their rapid, smooth response, under automatic control, to a wide range of flow demands.

Adjustable-Blade Pumps will vary in output to meet the gradual changes in flow requirement as compared to stepped increments of flow and possible surges which would result if fixed-blade pumps had been installed.

Two of these pumps will operate when required to raise the hydraulic grade line and supply adequate raw water to two remotely located treatment stations. As demand increases, a third pump will be used. A fourth pump is available for standby service. Pump blade angles are controlled automatically by a positioner responsive to downstream hydraulic grade line. A-1488



You may obtain full information on A-C Adjustable and Fixed-Blade High Capacity Axial Flow Pumps and Valves by writing to Allis-Chalmers, Hydraulic Division, York, Pennsylvania.

For phone number of closest representative see advertising index in back of book.

Jack Stumph Goes With Bronco

Jack Stumph, who formerly owned the J. H. Stumph Co. of Seattle, has been appointed general sales manager for Bronco products, it was announced by C. G. Gerlach, president of Western Insulated Wire of Los Angeles. Stumph has sold the manufacturers' agency to Associated Electrical Agents, which will continue to represent Western Insulated Wire. Before forming his own business, Stumph was associated with Graybar and with the Wire & Cable Division of U. S. Rubber Co. He has a degree in electrical engineering from the University of Southern California and is a registered professional engineer in the State of California.

Associated Electrical Agents is headed by Hugh E. Williams from headquarters at 1000 Fourth Ave. South, Seattle. A Portland office at 1504 N. W. Johnson St. is headed by George M. Roth. Stocks of Western Insulated Wire and Gedney Electric are warehoused in Seattle. The agency also represents Harvey Aluminum, Chester Cable, Solar Light, and Orangeburg underfloor duct.

► Appointment of **J. C. Maeder** as Western district manager was announced by National Electric Division, H. K. Porter Co. He was transferred to the Los Angeles branch office from Chicago, where he had been division branch manager. In his new position he will be responsible for sales activities in seven branch offices serving the 13 Western states. Maeder joined National Electric in 1931 as a member of the advertising department and then spent several years in the service department before entering sales.

Maeder

► **Alpha Wire** Corp. has expanded its Pacific Division to include a complete factory warehouse and sales operation, serving the 13 Western states. It has moved its facilities to a larger building at 11844 Mississippi Ave., Los Angeles, where it will have more than 12,000 sq ft and complete warehouse facilities. **Donald Rappaport** is manager of the Alpha Pacific Division.

► **Precision Multiple Controls** has appointed Shaffer & Nelson as its Pacific Northwest representative. Offices of the firm are at 1940 Occidental, Seattle; 1001 S. E. Water Ave., Portland; 1935 W. Broadway, Spokane; and 1415 S. Main, Salt Lake City. Precision Multiple Controls is represented in Alaska by John P. Bagoy Associates, P. O. Box 1005, Anchorage.

► **William E. Hare** has been appointed sales promotion specialist at Los Angeles for G-E's industrial sales operation. He succeeds the late William O. Kyte. A native of Cedar Rapids, Iowa, and a graduate of the University of California at Los Angeles, Hare joined G-E in 1957 as an accountant. Recently he has been serving as a sales engineer's assistant.

Hare

► **Holan Corp.** is sending a live line bare-hand team on a coast to coast tour of electric utilities to demonstrate and train crews in a new technique for working bare-handed on energized high-voltage lines. The new concept was developed by H. L. Rorden, high-voltage practices engineer for American Electric Power Service, and was tested at the high voltage laboratory of Ohio Brass Co., parent of Holan.

► Appointment of **Mine and Smelter Supply** Co.'s Salt Lake City branch as a Westinghouse agent and distributor has been announced by H. G. Hodgins, Intermountain district apparatus manager. The firm, which has headquarters in Denver, has been distributing Westinghouse electrical equipment there and at branches in El Paso and Albuquerque.

► **David G. Parker** has joined Incandescent Supply Co. of California and will be responsible for promotion of commercial and industrial lighting sales in eleven northern California branch offices. His headquarters will be at 647 Mission St. in San Francisco. Parker formerly was with the John C. Virden Co.

► **William Benndorf** Co. has been appointed **Feedrail** representative in the States of Arizona and New Mexico, and El Paso, Tex. Offices are at 221 East Camelback Road, Phoenix, and at 4204 Palo Duro Drive, N. E., Albuquerque.

Sea Water Conversion Plant

The Westinghouse Electric Corp. has begun construction of a 1,000,000-gal-per-day plant that will convert sea water to fresh water at Point Loma near San Diego, Calif. A contract for the project, which was awarded by the U. S. Department of Interior's office of saline water and which is jointly sponsored by the State of California department of water resources, calls for construction to be completed during November of 1961. Westinghouse will then operate the plant for a shakedown period of 75 days, including 30 days at the full daily output of 1,000,000 gal. Once in operation, it will be the largest multistage flash evaporator plant in the United States.

► **Brand-Rex** has established a new integrated wire and cable plant in Gardena, Calif., under management of **J. R. Garey.** According to Maurice Winger Jr., general manager, the move from Santa Monica to the new plant gives Brand-Rex the same type of facility in California as it has in its two Eastern plants and eliminates the assembly work done only at the old plant. Recent sale of its cable molding equipment to Cadre Industries of Endicott, N. Y., marked the discontinuance of the Rex Brand cable assembly business, the company said.

Garey

► **D. Howard McAllister** was named Western region manager for G-E's industrial sales operation. A native of Denver, he joined the company in 1937 on the engineering test program and since has served in engineering and supervisory positions. He was manager of component and intermediate distribution sales for the Rocky Mountain district before he was transferred to Los Angeles.

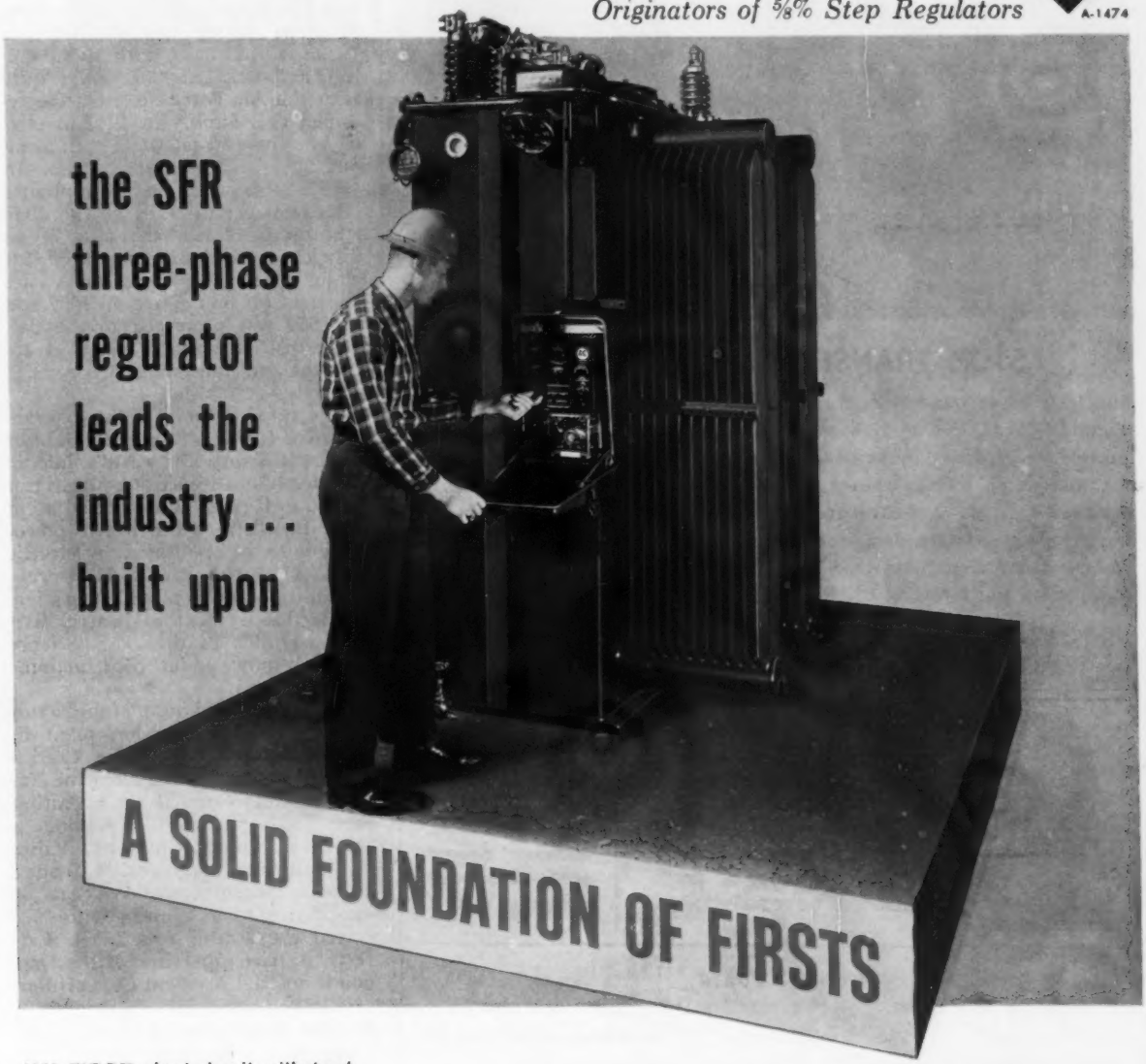
McAllister

► **Floyd E. Welch & Associates** of San Francisco have been appointed district representative for **Blaw-Knox** Co., Copes-Vulcan Division. Headquarters are at 55 New Montgomery St., San Francisco.

ALLIS-CHALMERS

Originators of 5/8% Step Regulators

A-1474



1960 FIRST short-circuit withstand of 40 times Vari-Amp current

1959 FIRST standard electrical drag-hand reset

1958 FIRST with Caliband control

1952 FIRST frictionless voltage-regulation relay

1940 FIRST Vari-Amp feature

1939 FIRST unit construction

1938 FIRST unidirectional breather

1935 FIRST voltage integrating time delay

1933 FIRST ⅝% step regulator

"Firsts" are important—they signify the extensive research, development and leadership at Allis-Chalmers. This program gives you the SFR regulator with its *33% saving in space . . . 30% lower cost per kva . . . 20% less weight.* And continuing research and development provides these additional SFR benefits:

78 fewer bolted connections, faster untanking and testing, all connections in full view—thanks to unit construction.

Fast, accurate control settings—assured by exclusive *Caliband* control.

Oil deterioration reduced—moisture and combustible gases eliminated by the unidirectional breather.

Operation at greater-than-nameplate current when range of regulation is reduced, with *Vari-Amp* position indicator.

Positive series winding protection, by externally mounted regulator by-pass arresters.

These are only a few of a number of benefits you get with Allis-Chalmers SFR feeder voltage regulators. For all the facts — call, wire or write your nearby **Allis-Chalmers** office.

Caliband and Vari-Amp are Allis-Chalmers trademarks.

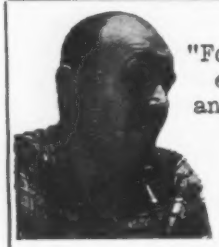
For phone number of closest representative see advertising index in back of book.

STOP TRANSFORMER FREEZE-UPS

Eliminate costly transformer corrosion and freeze-ups with a Horkey-Moore Porta De-Con unit. This compact, portable equipment decontaminates liquid petroleum products by removing particulate contaminants, water and air. Returns oil actually cleaner than new. Removes all free water plus all dissolved water down to 20 parts per million (80°F.), therefore requires far less frequent servicing. Increases dielectric strength beyond 35KV. Simple, automatic operation. Saves time, saves labor, saves equipment, saves cost of transporting and replacing oil. Reasonably priced. Send today for brochure.

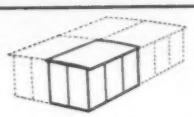
HORKEY-MOORE ASSOCIATES **Division of Houston Fearless Corp.**

24660 Crenshaw Boulevard, Torrance, California / SPruce 5-1211



"For a combination electrical field office and storage shed that's quick to move on and off the job, I like Porta House. We have them on several jobs."

Just telephone Porta House collect and get immediate delivery. Prefabricated, bolted, waterproof plywood panels—can be moved on a pick-up truck.



SIZES 6' OR MORE BY 9' OR MORE.

PORTA HOUSE

Ridgely K. Dodge 6767 Broadway Terrace, Oakland, Calif.

Phone collect for immediate delivery: OLympic 2-7237

Distributor (Sales & Rentals): Porta House, 8833 So. Alameda St., Los Angeles 2 • LUdlow 3-1301

WANTED

General Manager's staff of Northern California utility seeks employee to perform miscellaneous staff work with particular emphasis on economic and engineering aspects of bulk power supply. Electrical or civil engineer's degree desirable. Typical important assignments would be participating in negotiations for purchase of power with private utility and government agencies, planning future sources of power supply, assisting in working out problems with various state and federal agencies relating to large hydro construction program, load forecasting. Write Sacramento Municipal Utility District, P O Box 2391, Sacramento 11, Calif.

► Appointment of **Earl B. Mathews** as Salt Lake City district manager for **G-E Supply,** succeeding the late R. S. Belnap, has been announced by R. C. Gerster, Western zone manager. A native of Salt Lake City, Mathews joined G-E at Boise in 1939. He left in 1942 to attend college and was called to active duty with the Air Force in 1943. He rejoined G-E Supply in 1947 as electrical apparatus salesman with headquarters in Twin Falls, Idaho. In 1953 he was named major appliance sales manager in Boise and in 1956 was transferred to Salt Lake City as district merchandise manager for major appliances. He becames sales manager for housewares in 1957 and in 1959 was promoted to the Salt Lake district manager-electrical apparatus and housewares.

► General Electric Co. has announced it will be a **major exhibitor at the Century 21 world's fair in Seattle.** It has signed a contract for 10,000 sq ft of exhibit space adjacent to a futuristic hydroelectric power exhibit to be sponsored by electric utilities of the Pacific Northwest. In addition, it will provide two scientific exhibits for the six-acre, five-unit complex of the U. S. Science Pavilion now under construction.

► The Westinghouse Manufacturing and Repair Division plant in Portland has received the **Certificate of Commendation** from the National Safety Council for operating from 1957 through 1960 without a lost-time accident. Charles L. Painter, plant manager, and Lorence Hjelmaa, foreman with 35 years of experience with Westinghouse, received the award from C. R. Lafferty, district supervisor of the Oregon Industrial Accident Commission.

► **Don Steinkamp** of D. A. Steinkamp & Co. has been made sales representative for the Allen-Stevens Conduit Fittings Corp. of Woodside, N.Y. From headquarters at 16 Wazee Market, Denver, he will cover the States of Colorado and Wyoming.

► Construction has started at Sunnyvale, Calif., on **General Electric's** new 39,000-sq-ft **computer laboratory.** The $1,500,000 laboratory building is expected to be ready for occupancy early next year.

► Allen-Stevens Conduit Fittings Corp. has appointed **Sam Gamson** at its representative in southern California, Arizona and El Paso, Tex. His headquarters are at 223 S. McCarty Drive, Beverly Hills, Calif.

line cost– $85,000 per mile

insulators– $2,500 per mile

This tower has a busy future ahead. It's insulated now for a single 138-kv circuit. Later, it may carry a second 138-kv circuit. And eventually, it will support a bundled-conductor 345-kv line.

At the ultimate voltage, as shown in the figures above, cost of the O-B suspension insulators will total less than 3% of the cost of the line, including right of way.

No component costs less - - yet none is more important to the overall performance of this line.

For the purchaser of suspension insulators, this fact has a double-edged significance.

First, it means that the *overall cost* of a transmission line *cannot be materially reduced* by cut-rate prices on a component that accounts for only 3% of the overall cost.

Second - - and more important - - it means that *overall performance* of the line *can be materially reduced* by the cut-rate quality that usually accompanies cut-rate price.

Nowhere, in other words, do "penny savings" entail greater "dollar risks."

Your O-B representative has convincing proof of this in the form of a 25-minute sound-color film entitled, "The Second 50 Million."

Why not ask him to arrange a showing in your office?

OHIO BRASS COMPANY, MANSFIELD, OHIO

Ohio Brass

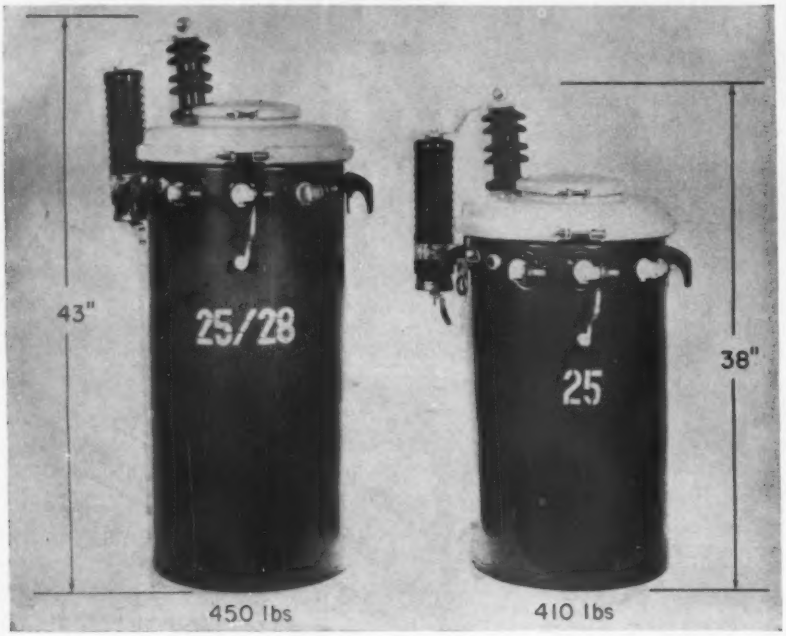
HOLAN

PORCELAIN INSULATORS • LINE HARDWARE • CAPACITORS • LIGHTNING ARRESTERS
BUSHINGS • HOLAN TRUCK-MOUNTED POWER DEVICES AND BODIES • BRONZE VALVES

10085-H

PRODUCT NEWS

New designs and applications



65 C Rise Distribution Transformer

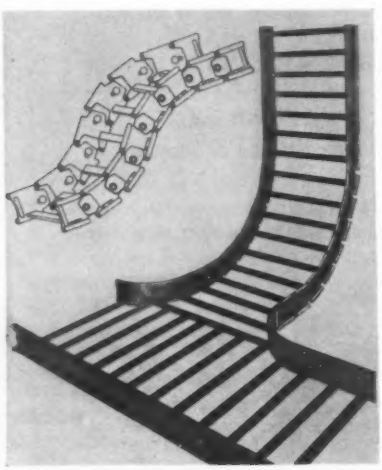
General Electric Co.

A new line of 65 C distribution transformers that will reduce the total owning cost of transformers for the nation's electric utilities has been announced by General Electric Co.

Presently in production in ratings of 167 kva and below, the new 65 C transformer designs are said to be up to 15% lighter and 12% smaller, and have lower losses than conventional 55 C units.

The company states that development of the Permalex insulation system and dual-kva units in the past few years led to the new 65 C transformer design, which will be offered at a purchase price up to 10% lower than previous 55 C designs. The reduced prices became effective July 9, and all purchases since that date will be billed at the new price levels.

Circle No. 1



Cable Tray Elbow

H. K. Porter Co. Inc., Delta-Star Electric Division

A new tray support system for insulated power cables, which features a vertical plane elbow that is a departure from conventional means for changing the direction of cable runs, has been developed by this company. The elbows are factory assembled and shipped as straight, rather than curved pieces, which should save on handling, shipping and storage space. In final form, the elbow will hold its shape, yet during installation it can be altered.

Circle No. 2

Manhole Heater

Morrison-Pelsue Co.

Designated model PE-G 800, a new ventilating heater for manhole and other underground use with detachable 800-w a-c generator is now in production at this Denver company's plant.

Circle No. 3

Conversion Process

Aqua-Chem Inc.

Aqua-Chem (formerly Cleaver-Brooks Special Products), pioneer and leading manufacturer of flash evaporation and vapor compression sea water conversion equipment, announced recently commercial availability of a new electrodialysis process to convert brackish water into fresh water at a cost substantially below that possible with any equipment currently in operation.

According to operating reports, the process, developed by a scientific research organization in the Netherlands, had actual conversion costs of 54¢ per thousand U. S. gallons at a 2,800,000-gpd brackish water plant for gold mines in southwest Africa. The cost figure is based on a 15-year program for the redemption of capital and accumulation of interest.

For comparison, a figure of 35c to 50c per 1,000 gal is commonly used as an average cost of delivering conventional fresh water to consumers in the United States.

Circle No. 4

Hand Bender

Greenlee Tool Co.

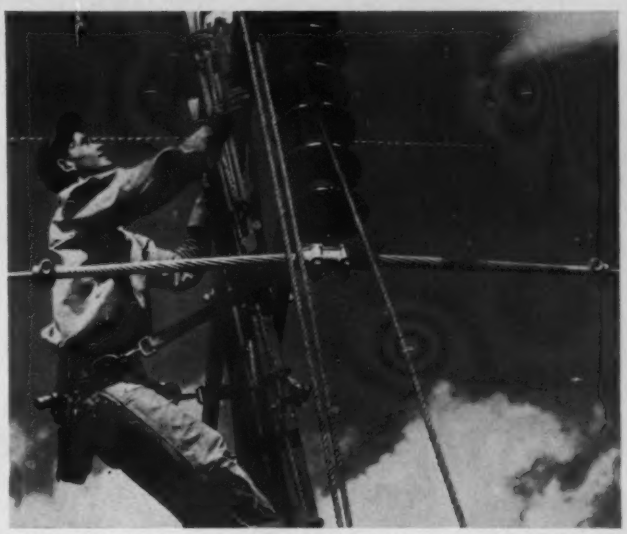
A new bender that in two seconds makes perfect offset bends in ½-in. EMT for entering switch and junction boxes, fuse boxes and other outlets is announced by Greenlee Tool Co. Both bends of the offset are formed simultaneously, easily and accurately simply by pressing down on the handle.

Called the Little Kicker, the new No. 1810 Greenlee bender assures tailored installations where ½-in. EMT conduit is used. It also eliminates time lost refitting or cutting and trying by hand. This new bender weighs only 5½ lb and is easily carried and operated by one man

Circle No. 5

ALCOA ALUMINUM
ACCESSORIES ROUNDUP

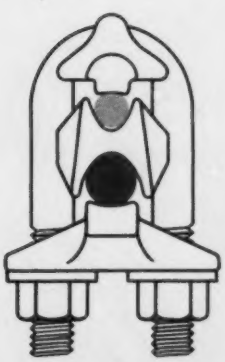
Alcoa Tapered Armor Rods provide two-way protection



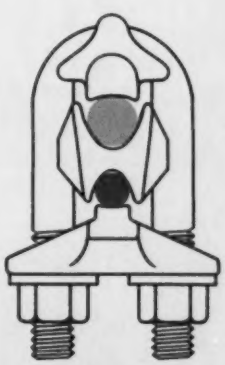
Armor rods protect transmission conductors in two important ways. First, and most obvious from a functional point of view, is *mechanical* protection and reinforcement at the point of support. The rods serve as a definite barrier to abrasion and to damage that might occur as a result of flashover and arcing.

Even more important—tapered armor rods give more protection against damaging *vibration* than any other type of rod reinforcement. In most cases, this protection is sufficient to eliminate the need for any additional damping devices. As a result, tapered armor rods can provide substantial savings.

Tapered rods act to reduce vibration both in amplitude and in total number of hours during which vibration occurs. Reduction in amplitude significantly lowers the cyclic bending stresses on the conductor and reduces fatigue. Reduction of the number of hours during which vibration occurs further lessens the possibility of damage. Although it takes a little more effort on the part of linemen to install tapered rather than other types of rods, the results are worth it. Time can be saved during installation by placing the complete set of rods in the wrenches on the ground, since all the rods are applied simultaneously. Alcoa makes and stocks a complete range of armor rods for ACSR and stranded aluminum conductors. Get all details from your nearest Alcoa-Rome representative.



CAT. 582·1



CAT. 581·2

Aluminum over copper...every time

Copper conductor, whether larger or smaller than the aluminum conductor to which it is being connected, can now be placed—as it should be—*below* the aluminum. The 580 series of U-bolt clamps has been supplemented to provide alternate positioning of grooves (see illustration). You can install this Alcoa clamp so that the open end of the bolt and nuts face downward for ready accessibility with hot line tools.

In addition, the upper limit for the No. 3 groove has been revised to include 795 MCM 26/7 ACSR and 1,000,000 CM stranded aluminum conductors. Complete details on delivery are available from any Alcoa-Rome representative.

(Continued on next page)

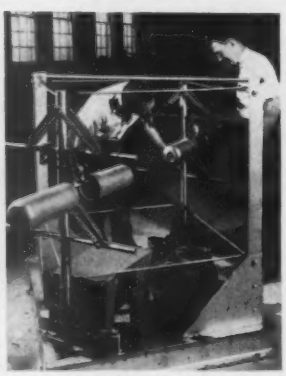
New Alcoa Service Entrance Connectors

CONDUCTOR SIZES						Wt. in Lbs. Per 100 Pieces	Cat. No.
"A" End			"B" End				
ACSR	AWG	Color Code	ACSR	AWG	Color Code		
2-6/1	2 Str.	Red	2-6/1	2 Str.	Red	2.9	791
			4-6/1 4-7/1	4 Str. 4 Sol.	Orange	3.0	792
			6-6/1	6 Str. 4 Sol.	Blue	3.1	793
4-6/1 4-7/1	4 Str. 2 Sol.	Orange	4-6/1 4-7/1	4 Str. 4 Sol.	Orange	3.2	795
			6-6/1	6 Str. 4 Sol.	Blue	3.2	796
6-6/1	6 Str. 4 Sol.	Blue	6-6/1	6 Str. 4 Sol.	Blue	3.3	798

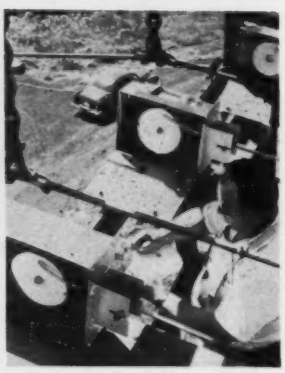
Pictured above is one of the Alcoa® 790 series service entrance connectors, and we feel sure you'll agree that they have all the features connectors need. End caps are color coded to industry color standards. The caps are made of thin aluminum, are easy to puncture with the wire, and hold the conductors while compressors are applied. Both barrels are filled with a joint compound having a melting point above 550°F, and each connector is clearly marked with easily readable identifying data. Installation of these connectors can be made with a variety of compression tools. Bore lengths are proportional to conductor size, and there's an integral solid barrier between bores. The new 790 series service entrance connectors are top-performance "Class A" connectors. They come 50 to a box. Get all the details from your usual source of Alcoa materials.

Research at Alcoa

Some projects assigned to our researchers go on continuously, over long periods of time. For example: Since the late 1920's, part of Alcoa's extensive facilities at Massena, New York, has been devoted to developing, testing, and establishing application data for dampers and other vibration protective devices for mechanical protection of overhead conductors. We regularly provide customers with engineering data and recommendations based on our findings. We'd be happy to discuss specific situations through local Rome Division salesmen.



Every new design in Stockbridge dampers is subjected to tests for fatigue resistance. This apparatus can create any desired frequency and amplitude of vibration desired.



Alcoa's outdoor test facilities at Massena, N. Y., include two towers with 1500-foot span; two sets of H-frame structures with 1000-foot spans; and two H-frame structures with 400-foot spans.

Summing up:

Alcoa tapered armor rods protect transmission conductors in two ways. They reinforce at the point of support and provide excellent protection against damaging vibration.

New 790 series service entrance connectors are designed for quick, easy, efficient handling and installation.

Alcoa research on vibration protection is one phase of an extensive program aimed at providing basic data about, and optimum performance from, transmission accessories.

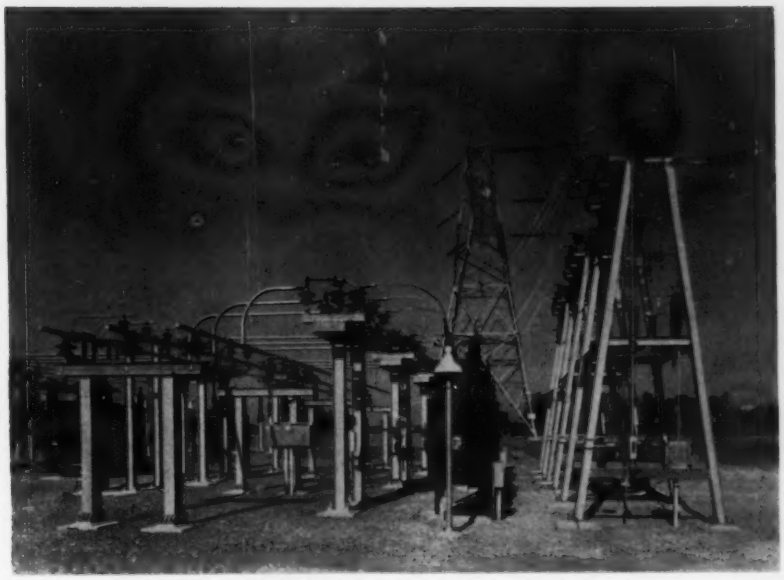
Supplemental design for U-bolt in 580 series clamp lets you position aluminum over copper—every time—no matter which conductor is larger.

Your nearby Alcoa-Rome representative is eager to supply full details on any or all of these items. Why not call him today?

Catalog of Tubular Accessories

Contains tabular data and catalog information on all Alcoa® tubular accessories. Also includes sketches of all accessories as well as installation instructions. For a copy, write Rome Cable Division of Alcoa, Rome, New York.

ALCOA
ROME CABLE
DIVISION



Aluminum Substation

Aluminum Co. of America

Alcoa has developed what it believes represents the highest voltage all-aluminum structure and bus for a utility substation.

Furnished by the company's Structural Division, the station structure employs 41,000 lb of 6061-T6 aluminum alloy, the majority of it in 10-in. or 12-in. wide flange beams. Main and line section buses and taps are welded aluminum tube.

Circle No. 6

Mercury Luminaires

Line Material Industries

Styled mercury luminaires, rated 400 w, are available from Line Material Industries to supplement the units rated 700 or 1,000 w. These fixtures are said to offer superior lighting performance and provide an aesthetic means of lighting streets, parking areas, shopping centers, parks and other outdoor areas.

Circle No. 7

Clock Outlet

Bell Electric Co.

This manufacturer of electrical items is marketing a three-wire clock hanger outlet that meets the new code requirements and is approved by UL. The new grounded outlet comes complete with wire leads for fast installation and is available in six metal finishes.

Circle No. 8

Data System

Monitor Systems Inc.

A new series 7000 data alarm scanning, telemetering and recording system for electric power utilities has been announced by Monitor, a subsidiary of Epsco Inc. The new system of modular building block design throughout utilizes standard field-proved components. The system automatically scans and measures voltages, demand, wattage, var and temperature quantities from potential transformers, punch-type demand meters, thermoverters and thermohm units located at remote substations, converts this information into digital form and telemeters it to a central control station where it is recorded by electric typewriter on preprinted log sheets. On automatic operation, measurement and transmission of data are initiated in a predetermined sequence by a digital timing clock. Measurement and transmission may be initiated manually at any time from either the central or remote substations.

Circle No. 9

Automatic Transfer Switch

Automatic Switch Co.

ASCO mechanically held automatic transfer switches are now manufactured in 1,200-, 1,600- and 2,000-amp sizes by the Automatic Switch Co. of Florham Park, N. J. These two- and three-pole switches are catalog listed to 600 v a-c, 250 v d-c.

Circle No. 10

Spade Terminal

General Electric Co.

A new rubber bushing with a spade terminal has been developed for use on General Electric's submersible network protectors by the company's Low Voltage Switchgear Department, Philadelphia, Pa.

Combining the spade terminal with the bushing into one integral unit, the new terminal provides a reduction in height of approximately 7 in. over the conventional porcelain bushing plus connector.

The bushing is made of a nonbreakable, hard rubber which makes its own gasket, and is coated with neoprene for added protection against leakage and other adverse atmospheric conditions.

Circle No. 11

Ground Detector

Parr Mfg. Corp.

Detection of accidental grounds on power lines is provided by the Brunt ground detector and alarm, developed by this company. When the instrument is wired to a power system, three-phase indicator lamps on the face glow with equal intensity. If a ground occurs, one of the lamps dims or goes out, indicating on which phase the ground has occurred. Simultaneuosly a red warning lamp flashes steadily and a relay actuates an audible signal which should be connected to the instrument.

Circle No. 12

LEVITON QUALITY TALKS

"ONE-STOP BUYING" at your Leviton distributor makes your job easier

Leviton, world's largest manufacturer of wiring devices, makes the most complete line of all you need for new home wiring or modernization jobs. Leviton products meet all codes, are listed by UL, come in hundreds of sizes, styles and types. There's a Leviton product in every category to meet your specifications and budget. Here are some typical examples:

CEILING RECEPTACLES. Sizes for every outlet box. U-Ground or side outlets, keyless or pull-chain, Quickwire, single or double screw terminals, in porcelain or bakelite. Hundreds of other choices. See your Leviton distributor.

SWITCHES. S.P., D.P. or three-way, with and without ears, top, side and end wiring, Quickwire, T-rated, Silent and Illuminated switches, in all amperages and voltages. One of the largest lines of switches in the world. See your Leviton distributor.

WALL PLATES. For outlets, switches and combinations. Single, two, three and four gang, weatherproofs, radio and telephone. Your Leviton distributor will show you plates for any application and budget.

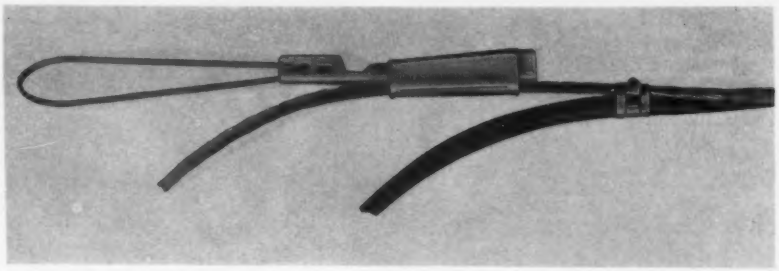
To save yourself time and trouble, be sure you have the latest Leviton ABC Contractor's Catalog. Write today for a copy.

LEVITON QUALITY TALKS BUSINESS

LEVITON®

LEVITON MANUFACTURING CO., INC.,
BROOKLYN 22, N.Y.
Chicago — Los Angeles — Montreal, Canada

Contact American Insulated Wire Corp., Pawtucket, Rhode Island, a Leviton subsidiary, for a complete line of insulated wire and cable products.



All-Aluminum Wedge

Jasper Blackburn Corp.

An all-aluminum wedge clamp for aluminum neutral messengers at service dead-ends has been developed by Blackburn. Aluminum-to-aluminum contact between conductor and clamp eliminates bimetallic galvanic corrosion, and is said to add substantially to the clamp's service life. Construction is heavy-gage, high-strength aluminum alloy, with flexible nylon-jacketed bail or rigid stainless steel ball.

Circle No. 13

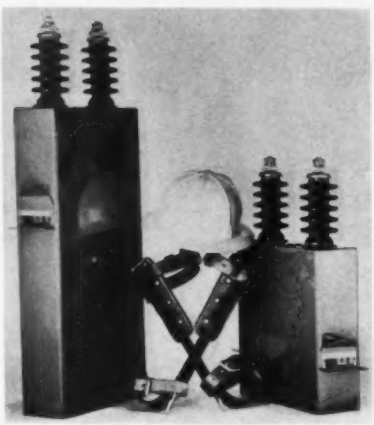
Pad-Mounted Transformers

Westinghouse Electric Corp.

Primary service pad-mounted transformers (PSP) designed for residential underground distribution on grounded wye loop or dual-feed systems in primary voltages up to 15 kv are offered by Westinghouse. The complete package of transformation and switching equipment is available in single-phase units, 10 to 167 kva.

The PSP unit consists of three main components: a transformer compartment, a detachable high- and low-voltage terminal compartment and a removable cover that provides complete isolation of all electrical connections and tank hardware.

Circle No. 14



Power Capacitor

Federal Pacific Electric Co.

Sizes and weights 25% to 30% smaller than those of available power capacitors are features of the new Cornell-Dubilier 50- and 100-kvar P. F. capacitors now being produced by Federal Pacific, Newark, N. J. These reductions provide the users with substantial savings in mounting and handling costs. This improvement in P. F. capacitors has been achieved by making full use of modern materials and through a new approach to well-established engineering principles of capacitor design.

Circle No. 15

Switch

I-T-E Circuit Breaker Co.

This company's Greensburg Division has announced a higher voltage application of side-break switches, in vertical configuration for wood pole mounting. The new design of all-aluminum welded switch mounting frames will support switches up to 115 and 138 kv, for one-way switching on a single wood pole. Other voltage ratings for two-way or three-way switching are limited to 69 kv.

Circle No. 16

It took lots of planning to put these parts to work for you

The dozens of items you see here are actual components of the direct-drive tap changer for Pole Star Distribution Regulators. One of the *simplest* LTC mechanisms in use today . . . it has an unsurpassed record for reliability in pole-top and station installations throughout the country.

It did not create itself, however. Thousands of man-hours (engineering, drafting, laboratory, machine shop, etc.) preceded patent applications and the first production order of this switch several years ago. Preliminary research, experimentation, testing . . . all were involved in our successful efforts to reduce the number of critical parts, and to assure utmost electrical and mechanical dependability.

Without such research-and-development efforts on the part of responsible manufacturers like Pennsylvania, there could be little progress in the electrical equipment field. And without significant improvements in equipment, America's light and power companies would be greatly handicapped in their own efforts at improving efficiency.

These are important things to remember in evaluating today's market conditions. It takes a healthy market to nourish R and D programs that in turn stimulate progress. The continuation of such programs is a matter of equal concern to manufacturers and purchasers of electrical equipment.

McGRAW-EDISON

by Gordon Wilson
CHIEF PLANNING ENGINEER
Pennsylvania Transformer Division

PENNSYLVANIA TRANSFORMER DIVISION
McGRAW-EDISON COMPANY CANONSBURG, PA.

Multipurpose Floodlight

Appleton Electric Co.

A new multipurpose floodlight has been added to the Appleton line. The new unit is said to include convenient service from the front or through a new swing-over design from the rear, self-centering inner reflector and special filter wick to keep reflector and cover glass free of dirt and condensation.

Circle No. 17

Rope

Berkley & Co.

This company announces a new rope product called gladiator polypropylene rope. The rope is said to be suitable for hand lines, pulling transmission cables, for block tackle, etc. As it sheds water, it is completely rot resistant, thus giving it a low electrical conductivity. The manfacturer says the rope is lighter in weight, yet 50% stronger.

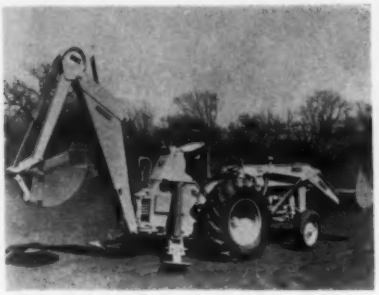
Circle No. 18

Messenger Traveling Block and Bracket

Sherman & Reilly Inc.

A messenger traveling block and new type messenger bracket introduced by this company is said to substantially increase the speed of installation of spacer-type aerial cable. All blocks are put on at lead pole and ride past intermediate poles without assistance or interruption of pulling operation.

Circle No. 19



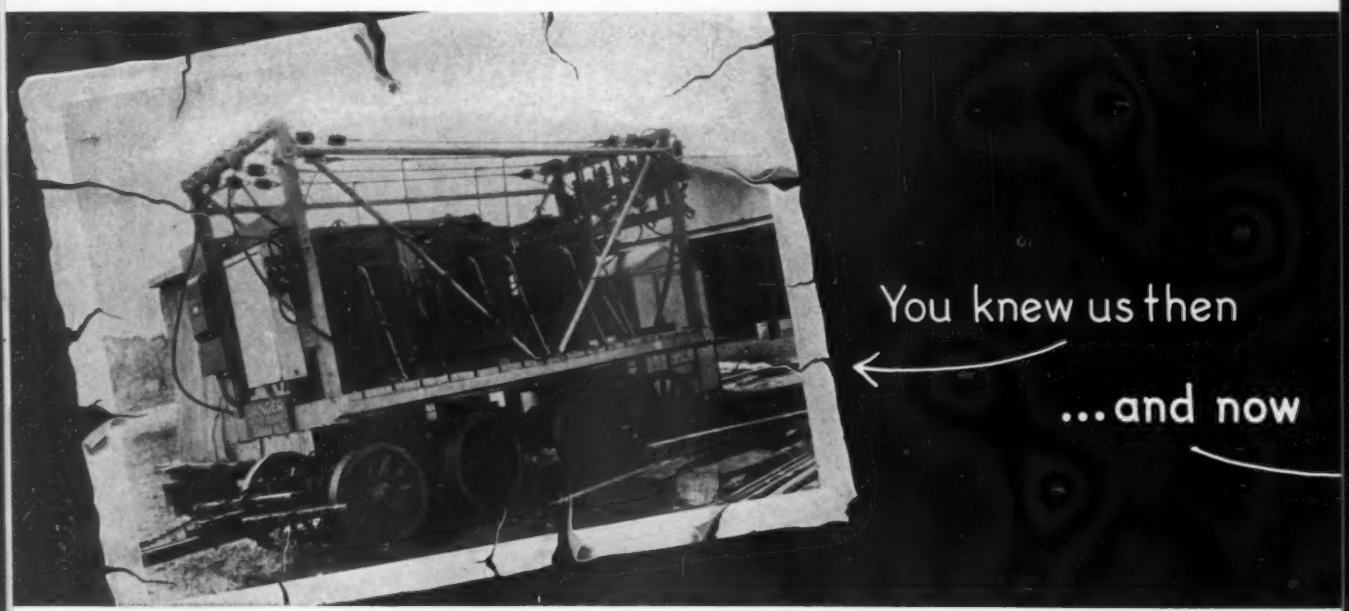
Backhoe End Loader

Oliver Corp.

A new Oliver 568 front-end loader with a variety of other front-end attachments and a new Oliver 71 rear-mounted, quickly removable backhoe have been announced by Oliver Corp, for use on the Oliver 550 utility wheel tractor.

The new loader and backhoe are available individually or in combination on the 550 tractor and make the tractor versatile for contractors and utilities.

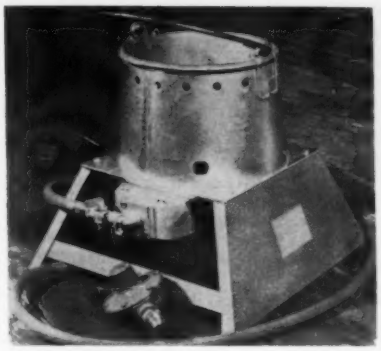
Circle No. 20



Allis-Chalmers sets the pace for mobile substation progress

Remember this 12,000-volt "powerwagon"? Of 1930 vintage, it contrasts sharply with its modern-day counterpart — the compact, 20,000-kva mobile substation on the right.

Since these early pioneering efforts, A-C research, development and manufacturing have proved their maturity . . . *Contributing:* • Better insulations for switchgear to handle larger blocks of power in smaller cubicles • Distribution regulators offering greatly increased short-circuit protection • A-C nuclear power plant development to hasten the day when power from the atom is proven to be economically practical in more areas of the world • New A-C fuel cells that may soon offer a new source of electric energy • A-C



Lead Furnace

Hupp Corp.

Utility linemen can cut fuel costs and metal losses by 75% with the new infrared furnace, according to this manufacturer's tests.

The 50-lb furnace, manufactured by Wagner Products Corp., is equipped with a cast iron melting pot mounted over a 12,000-Btu Perfection Schwank infrared burner, manufactured by Hupp.

Circle No. 21

Color-Coded Conduit

H. K. Porter Co. Inc.

A color-coded conduit has been introduced by this company's National Electric Division. It is a rigid steel conduit, available in all sizes and a choice of five colors, with matching elbows and couplings. Special colors may also be obtained. The new product was developed to provide economical color-coding of distinguishing runs carrying electrical lines from those carrying telephone or intercom lines.

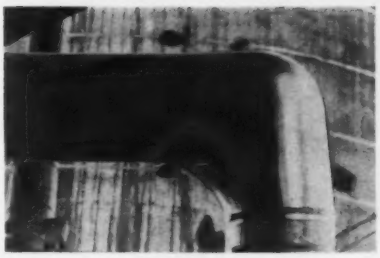
Circle No. 22

Power Pruners

A. B. Chance Co.

A complete line of power pruners is now being marketed by the A. B. Chance Co. to cut back trees near utility lines. The tools may be powered by compressed air, CO_2, dry nitrogen or from a truck or insulated bucket hydraulic system.

Circle No. 23



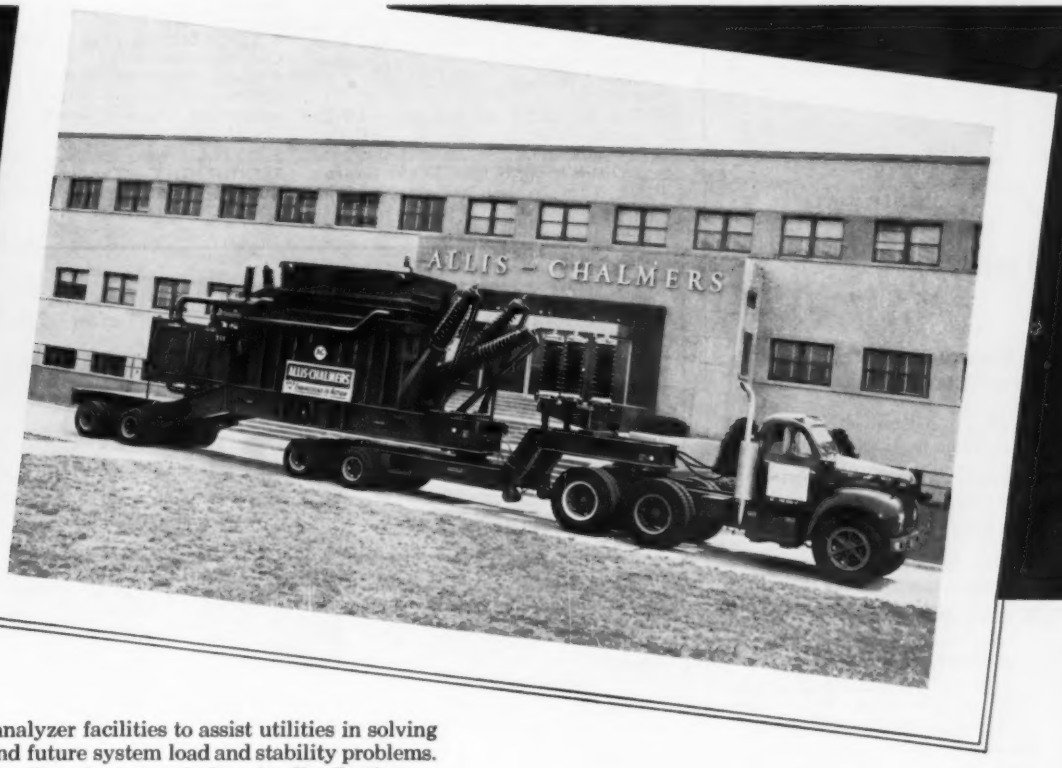
Aluminum Jacket

General Aluminum Supply Co.

A new aluminum jacket designed to protect and cover insulated pile ells has been introduced by General Aluminum Supply Co.

This aluminum ell jacketing, called a humped elbow, was created to solve the problem of all joint cracking on insulated piping. Engineers agree the weakest point of all pipe insulation is the ell joint. Cracks appear there because of pipe expansion and contraction. Such cracks seriously dilute the efficiency of the insulation.

Circle No. 24



network analyzer facilities to assist utilities in solving present and future system load and stability problems.

In generation, in transmission, in distribution — Allis-Chalmers has helped America's growing utility systems set the pace in low-cost electric power. *For more information, write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.* A-1431

ALLIS-CHALMERS

PENGO AUGERS

Save you money 4 ways

PENGO HEAVY-DUTY Twin Helix Augers—14" through 96" hole diam.

1 **BORE FASTER**...put real "teeth" in earth drilling, save wear and tear on your diggers.

2 **STAY ON THE JOB LONGER** ...all wearing parts replaceable in the field; no down-time for shop welding.

3 **COST FAR LESS TO MAINTAIN** ...reversible teeth cost only 90¢ each, pilot bit only $8.00. Parts interchangeable on all PENGO augers you are using...less inventory!

4 **A SIZE AND TYPE FOR EVERY BORING JOB**...Augers and boring heads (for welding to your present auger) available for every make of machine from post hole diggers to largest heavy-duty earth drills. Write for catalog.

PENGO Prope®

—the most satisfactory construction rope available today!

* GREAT STRENGTH (8,200 lbs. for ¾" diameter)
* LIGHT WEIGHT (11 lbs. per 100 ft. ¾" diameter)
* HANDLES AND SPLICES LIKE MANILA in any climate or weather
* WATERPROOF (even salt water); can't mildew or rot. Excellent dielectric properties.

PENGO-Prope is a synthetic rope of special construction available in all popular diameters from 3/16" to 2"; regular construction in sizes smaller than 3/16". Write for specifications, prices.

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ENGINEERING COMPANY, INC.
Santa Clara, California
Axminster 6-7712

MANUFACTURERS' LITERATURE

For fast action in securing the manufacturers' literature listed below and more information on new products described in the preceding pages, use the coupon below. Circle the items wanted and mail to Electrical West

ALUMINUM CONDUCTORS — New data on conductors, core wires, cable reels and conductor lengths are included in a revision of Aluminum Electrical Conductors, Stranded-Bare available from Rome Cable Division, Aluminum Co. of America. Included for the first time is information on 5005 aluminum alloy conductors, aluminized steel core wire for ACSR and details on a new size of expanded ACSR, 2,294 mcm, 2.32 in. diameter. *Circle No. 25.*

DISTRIBUTION TRANSFORMER LOADS—RT&E Corp.'s Concentration, spring 1961, contains a practical engineering approach to estimating distribution transformer loads from energy consumption. The article, with its charts and equations, was presented by Chester F. Mitchell to the Northwest Electric Light & Power Assn.'s recent Portland conference. *Circle No. 26.*

HEATERS—Built-in and portable heaters are described in a new bulletin offered by Markel Electric Products to architects, engineers and contractors. The 30-page catalog includes 300 models running from 500 to 10,000 w. *Circle No. 27.*

CONDUIT—Johns-Manville describes Transite conduit types I and II in a new brochure, TR-247A. Type I is a thin-walled asbestos cement conduit for installation in concrete, type II is a thicker-walled conduit for direct burial. For the 12-page booklet, *circle No. 28.*

POWER CIRCUIT BREAKERS — I-T-E's Power Circuit Breaker Division is offering four bulletins covering the full range of power circuit breakers from 14.4 kv through 230 kv. They include bulletin No. 2010-KSA, for distribution 14.4-23 kv, 100-500 mva; No. 2031A, for subtransmission 14.4-23-34.5-46 kv, 500-1,500 mva; No. 2231-KMA, for subtransmission 69 kv, 1,000-2,500 mva; No. 2250-KB, for transmission 115, 138, 161 and 230 kv, 5,000 to 15,000 mva. *Circle No. 29.*

JUNCTION BOXES — Information about its new GR series of explosionproof junction boxes with lens covers is offered by Killark Electric Mfg. Co. New models include copper-free, cast aluminum enclosures in eight sizes and are adaptable for housing meters, gages and instruments. *Circle No. 30.*

METALLIC FINISHES—Subalox Anodine metallic finishes in four colors are described in a technical bulletin No. 7 from Subox. The manufacturer states that each of the paints is self-priming in that a base of suboxide-of-lead provides good rust-inhibition, and that for general maintenance work a single coat usually suffices without primers or surface pretreatment. *Circle No. 31.*

MAGNET WIRE — Anaconda describes a new product, its class B cement coated epoxy magnet wire, in a technical brochure. This product is available in all round, square and rectangular sizes. *Circle No. 32.*

F FIXTURES—A 28-page brochure on its Contempo series of shallow, surface-mounted fluorescent lighting fixtures and diffusing elements is offered by Globe Illumination Co. For brochure A-6, *circle No. 33.*

FLOODLIGHT — The new Crouse-Hinds Quartz-beam floodlight is described in bulletin 2725. *Circle No. 34.*

ELECTRICAL WEST *Not good*
255 California St., San Francisco 11, Calif. *after October 1*

Please send me, without obligation, the new product information or catalogs.

If described in Product News, circle item number

		1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20	21	22
23	24	25	26	27	28	29	30	31	32	33	34

If described in advertising, fill in page number

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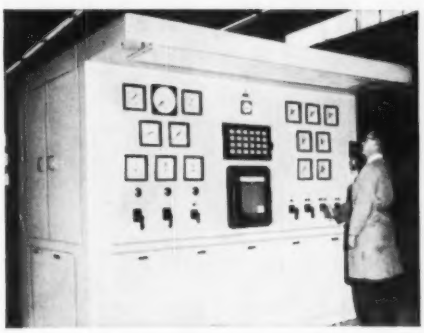
*Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

For two new projects in the South...

Governors by Pelton



Pelton governor being inspected prior to shipment to power plant

In addition to its extensive work in the Pacific Northwest (over 4,500,000 hp controlled by Pelton governors on the Columbia River alone), B-L-H's Pelton Division continues to supply governors for hydroelectric plants in other parts of the country. Two new U.S. Army Corps of Engineers projects in the South will use six Pelton governors.

For the Greers Ferry Dam and Reservoir on the Little Red River in Arkansas, Pelton is building two governors, each with a capacity of 243,520 ft.-lb. at a minimum operating pressure of 250 psi. At the Walter F. George Project on the Chattahoochee River, which forms the Georgia-Alabama border, four Pelton governors will be installed. At a minimum operating pressure of 300 psi, each is rated at 380,600 ft.-lb., of which 315,000 is for control of the wicketgates and 65,600 the Kaplan blades.

Pelton also manufactures hydraulic turbines, butterfly valves, spherical valves, pressure regulators, surge suppressors, waterworks valves, large centrifugal pumps, dynamic balancers, etc. For illustrated bulletins, write Pelton Division (B-L-H), 2929 Nineteenth St., San Francisco 10, Calif., or B-L-H Corporation, Philadelphia 42, Pa.

BALDWIN · LIMA · HAMILTON

Pelton Division • San Francisco, Calif.

Hydraulic turbines • Valves • Governors • Centrifugal pumps

Governors

For phone number of closest representative see advertising index in back of book.

ECONOMIC VIGOR SEEN IN WEST

W. J. BROWN, McGRAW-HILL ECONOMICS DEPARTMENT

Like a circus tiger jumping through a flaming hoop, the 11 Western states managed to come through the recent recession relatively unsinged. The trick is to keep moving quickly, and both the Western economy and the tiger do just that. More people were working at nonfarm jobs in the West this spring than a year earlier, although the employment increase was not quite large enough to accommodate all the new job seekers. As a result, new claims for unemployment insurance piled up at state agencies in the early months of the year, although they are now tapering off very rapidly. In addition, consumer incomes were 1% higher this spring than a year earlier.

Economic vigor in the West contrasted sharply with the nation as a whole during the first half of this year where the recession knocked personal incomes 1% lower and the number of workers on nonfarm pay rolls was 2% below its level a year earlier. Unemployment was also a problem nationally, as the 28% increase in new unemployment insurance claims for the first half of this year shows. The business upswing that has been under way for several months will undoubtedly improve the national picture enormously by the end of this year.

How the Western states and the nation fared in 1960 and in the first half of 1961 is shown in the accompanying table.

Electric Power

One thing the recent business slowdown didn't dim was electric power production. Utilities in both the West and in the nation as a whole posted gains in electric energy production for the first half. The 4% gain for the West was double the national increase of 2%. Continuing population growth plus substantial gains in industrial production during the second half of this year promise to keep demand for electricity growing.

Outlook For the Second Half

Further gains in over-all business activity through the rest of this year and right on into 1962 are a virtual certainty for both the West and the entire nation. The dollar volume of all new goods and services sold in the country rose 2% between the first and second quarters and double that gain will be scored between the third and fourth quarters. Industrial production rose 6% so far this year and will rise the same amount between now and Christmas. That will mean more workers on pay rolls, many of them earning more per week than they do now.

In general, gains in business activity will be slightly more pronounced in the West than for the country as a whole. The Western area has a head start on both personal income and employment so gains in those areas during the coming months may well double the national average.

Even with those gains in business activity, however, business will be no picnic. There's plenty of additional capacity lying around to absorb production increases, and the competition is keener than it has been for a long time. True, business will be gaining steam steadily, but we are not in for a runaway boom that will send profit margins to the stratosphere along with our astronauts.

10 KEY INDICATORS (MONTHLY AVERAGE)	WESTERN STATES 1st half 1960	2nd half 1960	1st half 1961*	% change 1st half '60 1st half '61	TOTAL U. S. 1st half 1960	2nd half 1960	1st half 1961*	% change 1st half '60 1st half '61
Personal income (billion dollars)	5.73	5.91	5.78	+ 1	33.53	34.05	33.30	− 1
Total nonfarm employment (million persons)	7.80	8.17	7.99	+ 2	53.00	52.80	52.16	− 2
Factory employment (million persons)	1.89	1.96	1.88	0	16.53	16.15	15.66	− 5
Other nonfarm employment (million persons)	5.91	6.21	6.11	+ 3	36.47	36.65	36.50	0
Department store sales (Index, 1947-49=100)	156	157	159	+ 2	144	146	145	+ 1
Housing starts (nonfarm-thousands)	27.6	24.0	27.3	− 1	109.2	126.4	101.7	− 7
Industrial building contracts (million dollars)	55.5	87.3	61.9	+12	297.8	338.0	291.5	− 2
Weekly factory earnings (dollars)	97.53	98.17	99.06	+ 2	91.15	90.60	91.04	0
Initial unemployment claims (thousand persons)	49.5	60.1	58.6	+18	281.1	367.4	359.5	+28
Electric power (billion kwh)	11.98	12.57	12.42	+ 4	61.61	63.87	62.94	+ 2

Sources: Employment, Unemployment, Weekly Earnings—U. S. Dept of Labor; Personal income—Business Week; Department store sales—Federal Reserve Board; Housing starts—Census Bureau; Industrial building contracts—Engineering News Record; Electric power—Federal Power Commission.

* Estimated by McGraw-Hill Department of Economics.

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LONG-LASTING PROTECTION FOR YOUR OVERHEAD SYSTEM

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One plate tower ground clamp

Type GTC 2
Two plate tower ground clamp

Copper Bonded Pigtail

Type GUV
U-bolt ground clamp parallel or 90°

Steel Driving Stud
for Sectional Ground Rods

Copper Alloy Coupling
for Sectional Ground Rods

Copper Bonded Sectional Ground Rods

Copper Bonded Regular Ground Rods

Type GG
Ground Rod Clamp
Socket set screw

Type GGH
Ground Rod Clamp
Square head bolt

Type B
Budget Line Ground Rod Clamp
Square head bolt

Type GP 100
Electrolytic Copper Pole Bottom Plates
7½", 10", 14" dia.

Blackburn grounding devices will save you thousands of dollars annually in preventing burnouts of expensive overhead equipment. This complete line simplifies your stocking problem—one source for all your needs. Like all BLACKBURN products they are constructed of high-strength corrosion resistant materials—designed for easy installation and engineered for long-lasting, trouble-free grounding. Always specify BLACKBURN.

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LATE NEWS

Continued from page 59

► **Strike of Hoisting and Portable Engineers,** local 701, of projects in Oregon drew a recommendation from the Portland Chapter of AGC to lay off members of that local which was being followed by several general contractors. Eight projects struck included the John Day Dam project, East Bank Freeway project of Oregon Highway Department. But the new Hilton Hotel job and the Portland Post Office were continuing without the hoisting engineers.

► **Wasatch Electric Co.** of Salt Lake City was awarded the contract by Kennecott Copper Corp. for the relocation of a transmission line and substation on the upper east side of the Bingham mine. The 44-kv line will connect with a new substation at the 6,840-ft level in Telegraph Gulch.

► **Norman P. Van Valkenburgh,** a gas and oil line contractor from Pasadena, was appointed by Gov. Edmund G. Brown to the Contractors State License Board to succeed J. E. McNeil of San Marino who resigned.

District 9 Meeting

Ninth District Council of National Electrical Contractors Assn. is meeting at Hotel del Coronado, Coronado, Aug. 11-12. The council consists of officers of the various chapters in District 9, which covers the States of California, Nevada and Hawaii. Review of the recent legislative sessions actions will be on the agenda as well as summary of recent labor negotiations results. Preceding the district meeting there will be a three-district meeting of the chapter managers of districts 6, 8 and 9, on Aug. 9-10. Missile site situations will be reviewed in the light of the recent presidential directive to clear up delays and controversies therein.

Tribute Paid Harter

George Harter, popular and dynamic manager since 1951 of the Santa Clara-San Benito Chapter of National Electrical Contractors Assn., which he helped to found, was given a testimonial "farewell" dinner by the electrical industry of the area, June 30, in San Jose. More than 150 attended to wish him success in his new job as manager of the San Francisco Electrical Contractors Assn. and to express admiration and gratitude for what he had done to elevate and improve the industry during his service in the San Jose to Santa Barbara coastal area.

Tributes to Harter were paid by Richard Wilkinson, chapter president, Kelvin Young, chapter governor, W. P. Nelson of *Bay Area Building Reporter*, and by Henry T. Gunderson, coordinator for the Electrical Construction Industry. The chapter and the industry group presented Harter with a complete camera and projector outfit as a remembrance.

Ray Rosendin, George Harter with plaque, Richard Wilkinson and Kelvin Young; Henry Gunderson at mike, at farewell dinner by the electrical industry honoring Harter

12-V Swim Pool Laws

A new swimming pool lighting ordinance was passed and put into effect by the city of Burbank, according to Larry Trim, chief inspector. It is similar to the New York City rule which was instituted in November of 1960. The Burbank rule calls for underwater lighting of the fixed type to be of an approved type and installed as a fixed unit to a properly grounded conduit system through pressure sealed bushings provided in the deck or connection box. Underwater lights of a portable or non-fixed type are limited to 12-v and supplied by an isolating transformer located at least 10 ft from the water's edge.

Wording of the New York rule prohibits "use of 120-v lamps in submersible lighting units for illumination of swim pools, reflector pools or display fountains. Permissible voltage shall not exceed 15 v. Transformers for such lighting shall be of two-winding, isolating type and having grounded metallic shield between the primary and secondary windings to prevent accidental contact between windings under fault conditions. The transformer shall be remotely located from the lighting units that they supply and overcurrent protection shall be provided in both primary and secondary windings.

Fresno also has recently put in effect requirements that wet niche type lighting fixtures be operated at not over 15 v and autotransformers are not allowed. The city of Beverly Hills has also been considering similar regulation.

► **An outdoor lighting show** was contributed to the Marin Outdoor Art Show at Ross, Calif., during the July 4 week. The electrical industry, including NECA, Northern California Electrical Bureau, PG and E and distributors, installed decorative garden illumination to the capacity of the wiring system at the Art Club, gave short lectures and made demonstrations of various effects. The impression was so favorable that plans are being made to increase capacity for even better results next year.

► **William S. Edwards** has been elected by the board of directors of Hollywood Wholesale Electric Co. as president and general manager of the firm.

► **James Dieffenwierth,** formerly with Shalda Mfg. Co., has joined the Krieger-Koufax Co.

with Sangamo Dual Range Mechanical Demand Registers

Sangamo DR registers improve metering accuracy, keep pace with load growth, reduce register change-outs, and cut inventory costs by reducing the number of meters and registers you need to stock.

The Sangamo dual range (DR) mechanical register has a "flip-over" scale plate that permits rapid in-the-field range changes while assuring positive interlock between scale and range selected. It is available for singlephase and polyphase watthour meters in both universal and standard scales.

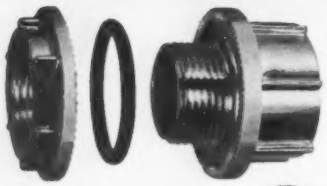
A range change is accomplished by simply loosening (not removing) six screws and reversing the scale plate. Only one gear moves, and the register does not require readjustment after the change - - - accuracy is always ±1% of full scale. Polished, hardened stainless steel pivots and jeweled bearings maintain the high accuracy.

And in the DR, you can rely upon the Type H slow speed, high torque motor to remain trouble free. Sangamo's gravity reset action further assures dependable, maintenance-free performance. Your Sangamo Representative has other important information about the DR.

PW61-8

SANGAMO ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

specify proven quality
MYERS
SCRU-TITE HUBS
for rigid conduit



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- **CAPTIVE O-RING SEAL!** only captive "O" rings assure water and dust-tight installations!
- **NO WELDING!** serrated nut **and** hub bite both surfaces; positive, vibration-proof ground!
- **U.L. APPROVED** for service entrance conduit!
- **ALL SIZES** from ¼" to 6"

Order from your Myers Electrical Distributor
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QUICKLY Installed
TOUGH For long life

EVERSTICK ANCHORS

For new construction and maintenance — Everstick Anchors speed up work and provide dependable anchorage on all types of jobs. Made of resiliant, rust resistant malleable iron. The toughest anchors made. Write for bulletin.

EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

Proposed Western Projects

Rocky Mountain

Boulder, Colo., National Science Foundation, Washington, D. C., science lab, $40 million.

Denver, shopping center, $2,500,000. In care of Ralph D. Peterson & Associates, architects.

Boise, Idaho, Alsco Inc., shopping center expansion, $2,000,000. Plans by Ed Trout.

Boise, City, municipal airport reconstruction, $1,225,000.

Salt Lake City, City-Salt Lake City Corp., library, $2,000,000. Plans by Ralph A. Edwards.

Pacific Southwest

Page, Ariz., A. H. Green Corp., motor hotel, $3,000,000.

Phoenix, Del E. Webb Corp., 17-story office, $20 million.

Camp Pendleton, Calif., 11th Naval Dist., San Diego, Marine weapons station, $10 million. Plans by Welton Becket & Associates, Los Angeles.

Los Angeles, Tjomsland-Traverse, bowling alley office, $1,000,000. Shatto-Tjomsland Co. and Hawkins & Lindsay, Glendale, architects; W. C. Taylor, Pasadena, engineer.

Los Angeles, Webb Knapp Inc. and Aluminum Co. of America, office and underground parking, $6,710,000. Plans by Welton Becket & Associates.

Santa Ana, Board of Supervisors, county jail, $3,000,000. Plans by William Faulkner.

Pacific Northwest

Vancouver, B. C., Canadian Government, air terminal, $12-18 million.

Bodega Bay, Pacific Gas and Electric Co., nuclear power plant, $58 million.

Menlo Park, Alec Unified Department Store, store, $1,000,000. In care of Simpson & Stratta, San Francisco, architects-engineers.

Redwood City, Crocker Land Co., warehouse, shop and office, $1,250,000. Plans by Walter E. Mooney, San Francisco.

Sacramento, Professional Bldg. Co., medical bldg., $1,800,000. Plans by Starks, Jozens & Nacht.

San Francisco, College of Physicians & Surgeons, dental school, $5,000,000. Plans by Skidmore, Owings & Merrill.

San Jose, City, airport terminal bldg., $1,400,000. Plans by Hollis Logue.

San Jose, Stone & Schulte, shopping center, $7,000,000. Plans by Welton Becket & Associates, San Francisco.

Lake Tahoe, Nev., Bill Parry & Associates, restaurant, $1,500,000. In care of Jane M. Parug & Rifat A. Parug, architects, Berkeley, Calif.

Wauna, Cerro Corp., aluminum reduction plant, $30 million.

Kirkland, Wash., Evergreen Properties, shopping center, $1,500,000.

Port Orchard, Kitsap County Board of Commissioners, airport runway extension, $2,000,000.

Seattle, City, parking structure, $1,600,000. Plans by N. G. Jacobson & Associates and Kirk, Wallace & McKinley.

Seattle, Providence Hospital, underground hospital addition, $5,000,000.

Seattle, University of Washington, parking including moving sidewalks, $2,335,000. Health sciences addition, $1,000,000; primate research center, $1,539,014; plans by Naramore, Bain, Brady & Johanson.

Spokane, General Services Administration, Washington, D. C., courthouse and federal office, $8,694,000.

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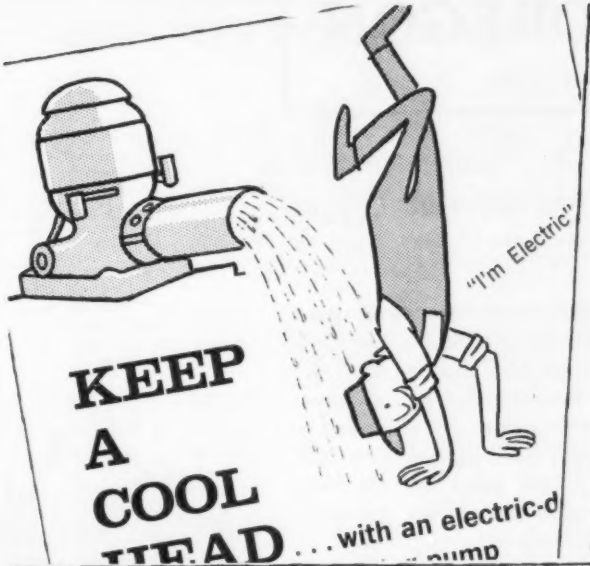

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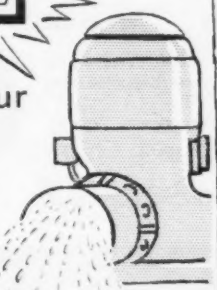

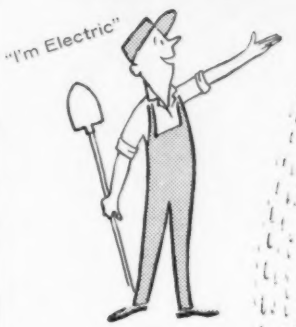

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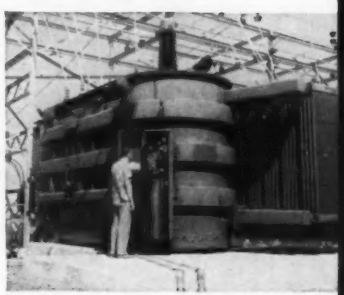

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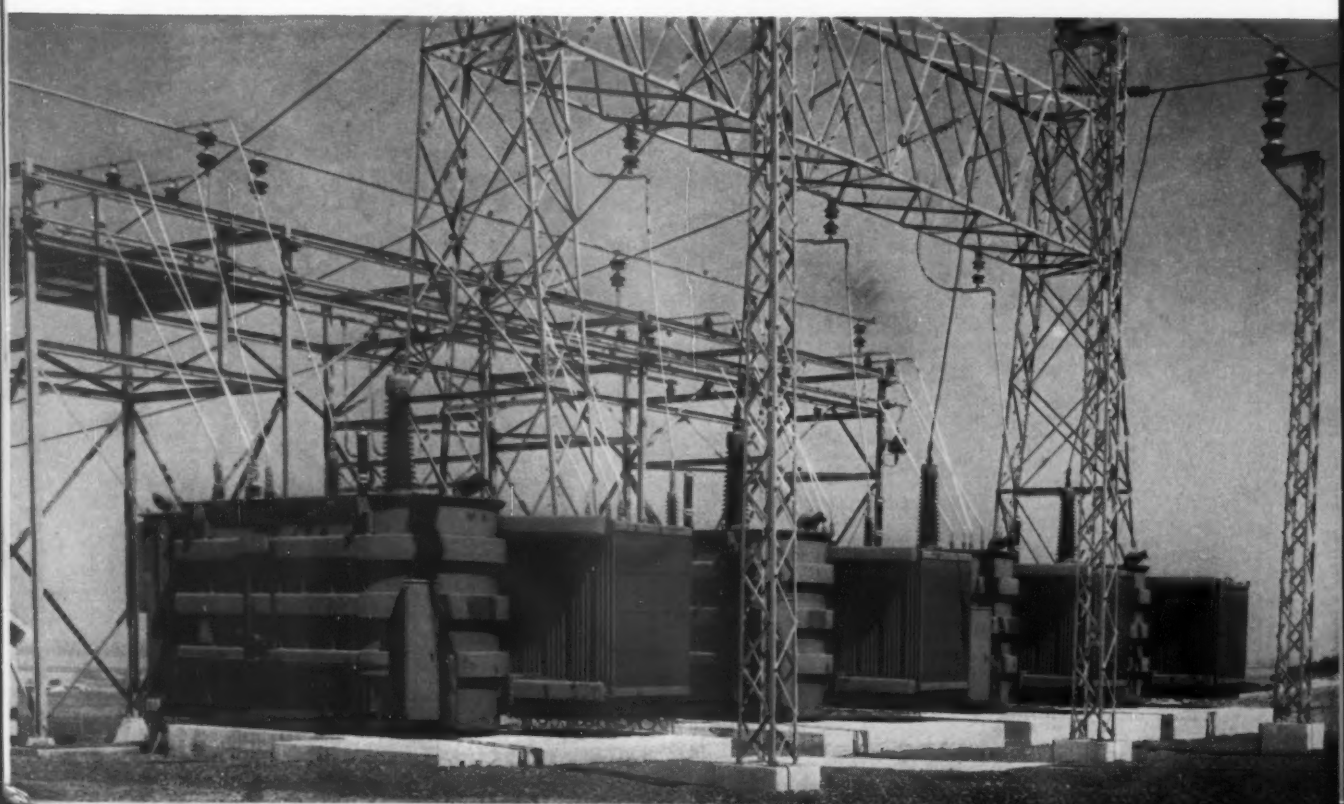

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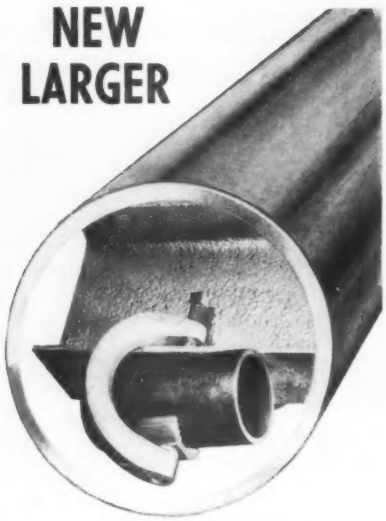

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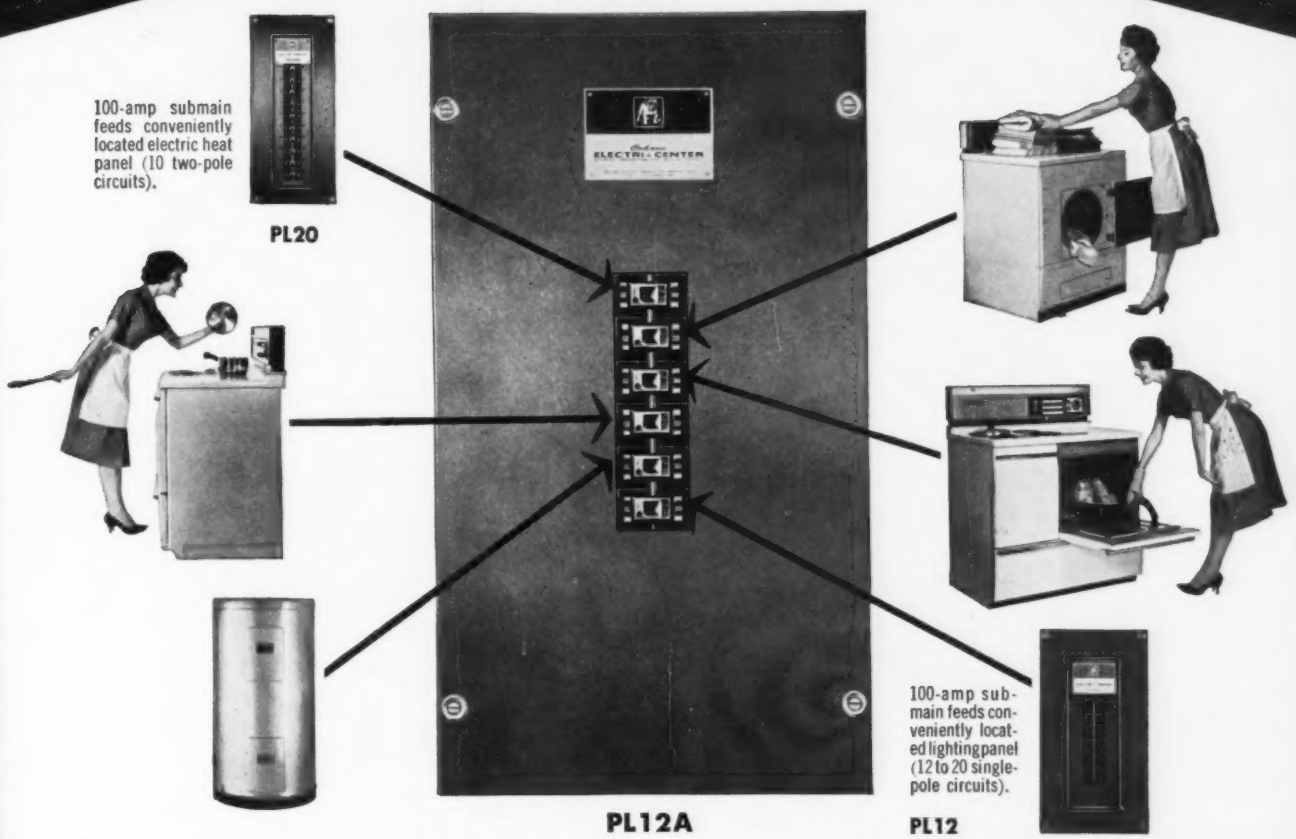
100-amp submain feeds conveniently located electric heat panel (10 two-pole circuits).
PL20
ELECTRI-CENTER
100-amp submain feeds conveniently located lighting panel (12 to 20 single-pole circuits).
PL12A
PL12

Originated by BullDog expressly for service distribution in all-electric homes, the Pushmatic® 200-amp PL12A Electri-Center® provides any combination of circuits up to 24 poles . . . and allows location of subpanels for customer convenience—and *wiring convenience!* Other 100- and 200-amp Electri-Center panels provide a wide choice that meets all other residential requirements.

Pushmatic circuit breakers protect two ways! In Pushmatic breakers from 15 to 50 amps, a built-in time-delay prevents nuisance tripping from harmless, normal current inrush, but assures positive protection against dangerous overloads. In every Pushmatic, a magnetic coil trips immediately, *without* delay, if a short circuit occurs. By combining these two safety systems, Pushmatic breakers assure dependable protection under all residential load conditions.

For details write for your "Pushmatic Pocket Guide"—it's free!

1961 AMERICAN BUILDER SEAL OF QUALITY

BullDog Electric Products Division, I-T-E Circuit Breaker Company, Box 177, Detroit 32, Mich. In Canada: 80 Clayson Rd., Toronto, Ont. Export Division: 13 East 40th St., New York 16, N.Y.

Consult the following Pacific Coast representatives:

Coast Electric & Manufacturing Co.
1733 N. E. Seventh Ave., P. O. Box 7866
Portland 12, Oregon

Young Electric & Mfg. Co.
2134 Curtis St.
Denver 2, Colorado

Safety Switchboard Company
910-89th Avenue
Oakland 21, California

BullDog Elec. Prod. Co. of Los Angeles
3020 Supply Ave.
Los Angeles 22, California

I-T-E CIRCUIT BREAKER COMPANY
BULLDOG ELECTRIC PRODUCTS DIVISION

SAFE, RELIABLE, EFFICIENT

Insulated covers—highly domed and with a minimum of external hardware—thwart both the elements and squirrels. Functional design is just one of the many outstanding quality features in Delta-Star's new series of Western designed, Western built utility transformers. Together they spell reliability, low losses, high performance—PROVEN SUPERIORITY!

DELTA-STAR ELECTRIC DIVISION

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